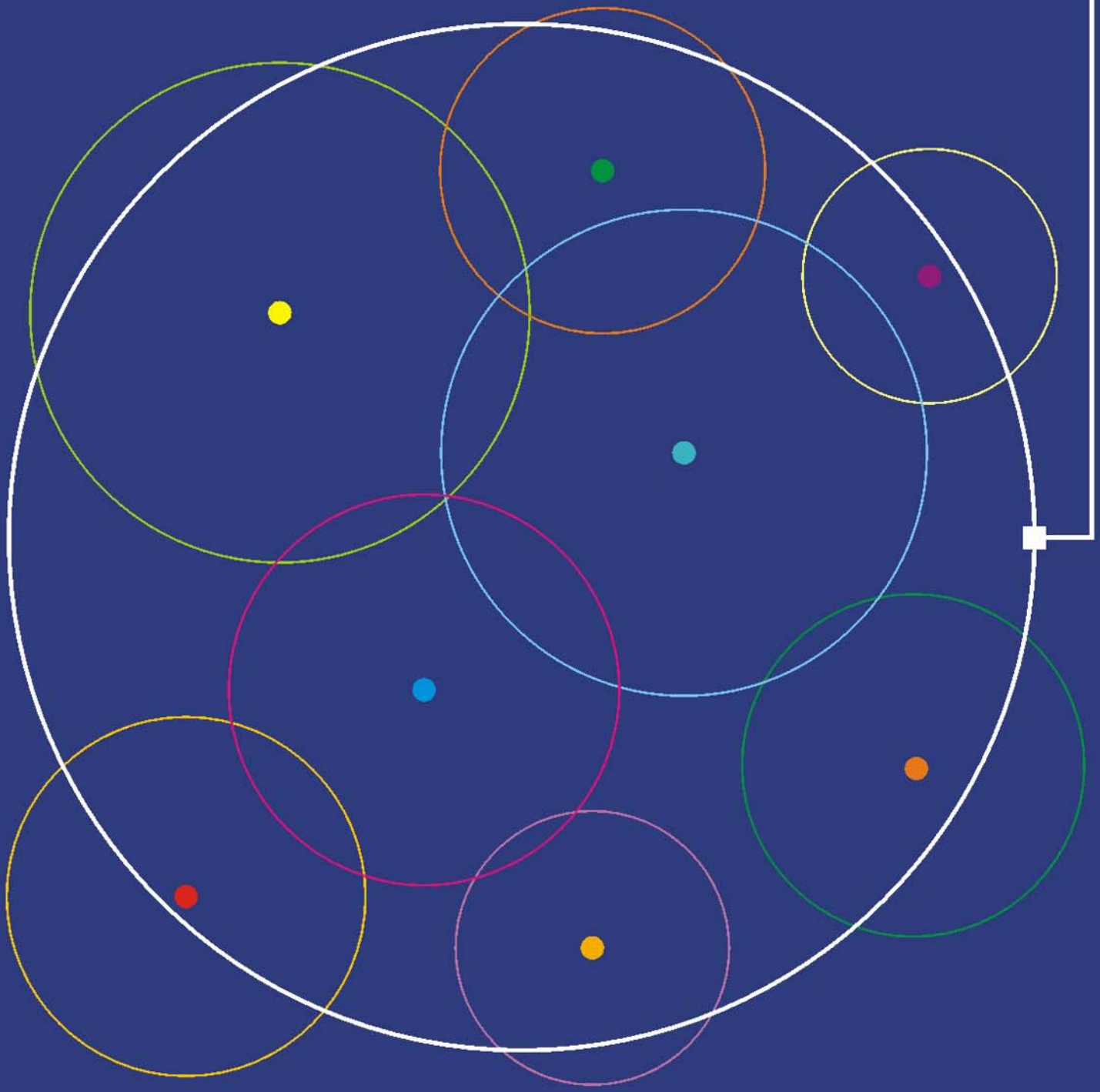
eSEEurope Regional Information and Communications Technologies Sector

Status and Usage Report:
Building an Information Society for All



Sarajevo, Bosnia and Herzegovina - OCTOBER, 2004

eSEEurope Regional Information and Communications Technologies Sector Status and Usage Report: Building an Information Society for All

Dear Reader,

It is a great honor to present the "eSEEurope Regional Information and Communications Technologies Sector Status and Usage Report: Building an Information Society for all". This Report represents an exceptional effort in supporting the coordinated development of the Information Society in South- Eastern Europe. Considerable efforts have already been invested to overcome difficult challenges. However, in the great endeavor to bridge the developmental gap with the rest of Europe, the state of the Information Society has often been neglected.

Information and communications technologies are powerful tools to transform SEE countries into modern, transparent and open information societies. The aim of this Report is to draw the attention of governments, at all levels, to this fact. This report is a strategic tool for decision makers in tailoring national Information Society policies and strategies. The document assesses key policies, projects and programmes impacting the ICT sector. This strategy will help the region to leapfrog towards the ultimate goal of European integration.

The successful solutions and positive experiences described in this Report can be applied in other countries. This report provides a common knowledge base in area of ICT for development and we hope to trigger off an exchange of best practices between governments, business communities, NGOs, academia and international organizations. This Report also shows best practices to potential investors.

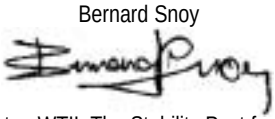
The report shows the current status and highlights best practices from the SEE ICT sector and evaluates the position of each individual country, in comparison with the other countries of the Region. We are confident that the Report is a starting point for further research. Furthermore, this Report proposes a coherent set of benchmarks for the development of the Information Society in the countries involved in the Stabilization and Association Process.

In this respect, the "eSEEurope Regional Information and Communications Technologies Sector Status and Usage Report: Building an Information Society for All" can furthermore be used to coordinate the international assistance and support the development of the Information Society, in areas where the SEE countries are lagging behind. We are convinced that this Report also will provide guidance to the countries of SEE to reach important milestones on their road to the European Union.

Jens Toyberg-Frandzen

UNDP Resident Representative

Bernard Snoy



Director, WTII, The Stability Pact for SEE

The ICT Sector Status Report presents the status and usage of ICT[1] sector in SEE[2] region. This document provides a review and analysis of existing policies and strategies impacting the ICT sector. It also provides an analysis of major Information Society development pillars individually for Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia[3], Moldova, and Serbia and Montenegro (Kosovo, Montenegro and Serbia).

eSEE Chairperson:	Marijana Vidas Bubanja
Director of WT II:	Bernard Snoy
Stability Pact Expert:	Jani Bogoevski
Head of eSEE Secretariat:	Nera Nazečić
Regional Coordinator:	Zlatan Šabić
Authors: Regional Perspective	Zlatan Šabić
Albania:	Yevgeny Korneev
Bosnia and Herzegovina:	Zlatan Šabić
Croatia:	Mladen Mauher
FRY Macedonia:	Zoran Janevski
Moldova:	Victor Besliu, Galina Tcaci
Serbia and Montenegro/Serbia	Marijana Vidas Bubanja
Serbia and Montenegro/Montenegro	Ruzica Mišković
Serbia and Montenegro/Kosovo	Besim Ilazi
Contributor:	INA SouthEastern Europe Telecommunications & Informatics Research Institute
Editors:	Tarik Zaimović, Nera Nazečić

1 ICT - Information and Communication Technologies
2 SEE - South-Eastern Europe
3 FYR Macedonia - Former Yugoslav Republic of Macedonia

Review team:	Moises Venancio (UNDP BiH), Yuri Misnikov (UNDP RBEC), Bernard Snoy (Stability Pact), Richard Harris (European Commission/DG IS), Pantelis Angelidis (INA), Mario Apostolov (UNECE), Stuart Kerr (CLDP), Miklos Havass (Hungary), Dusan Caf (Slovenia)
eSEE Chairperson:	Marijana Vidas Bubanja
Director of WT II:	Bernard Snoy
Stability Pact Expert:	Jani Bogoevski
Head of eSEEurope Secretariat:	Nera Nazečić
eSEE e-Envoys and Appointed Senior Policy Officials:	
Albania:	Dhurata Kurti
Bosnia and Herzegovina:	Slavko Marić Branimir Mandić
Croatia:	Dijana Šimić
Macedonia:	Ljuben Talev Elica Percinkova
Moldova:	Sergiu Sytnic Nicolae Cristea
Serbia and Montenegro/Serbia	Zoran Purić Branislav Anđelić
Serbia and Montenegro/Montenegro	Ruzica Mišković
Serbia and Montenegro/Kosovo	Agim Kukaj Louise Carvalho (UNMIK)
UNV:	Ad de Raad, Nicola Tiezzi, Fatima Smajlović
Proofreading:	Douglas Van Wieren
UNDP-UNV:	Jens Toyberg- Frandzen, Luna Abu-Swaireh, Thuan Nguyen, Ad de Raad, Moises Venancio, Tarik Zaimović, Nicola Tiezzi, Fatima Smajlović, Anna-Kristina Stjarnerklint , Chiara Pace, Cornelis Klein, Nataša Matijašević, Christine Roth, Conor Lyons, Francis M. O'Donnell, Nenad Rava, Aleksandar Jovanović, Garret Tankosić- Kelly, Mirsad Bibović, Frode Mauring, Matilda Dimovska, Zoran Veličkov, Suzana Ahmeti, Bruno Pouezat, Irene Stavenski, Ion Cosuleanu
Interviewers/NUNVs/Interns:	Valentina Pellizer, Enik Pogace, Stefania di Paola, Manja Huzbašić, Noemi Cerecedo, Ivana Ivičić, Robert Babić, Aferdita Dragaj, Zoran Savić, Siniša Trkulja, Kristina Kuzman, Vanja Grgurović, Ana Pejčinova Emilija Bumbarovska, Vitalie Vremis, Galina Tcaci

Special acknowledgement to United Nations Development Programme Bosnia and Herzegovina for financial backing and anchorage, United Nations Development Programme Offices in Albania, Croatia, Kosovo, Macedonia, Moldova, Montenegro and Serbia for their strategic support, United Nations Volunteers for extraordinary partnership, Stability Pact for their support to eSEEurope Initiative and assistance in realization of this project, INA Institute for valuable contribution in the domain of telecommunications infrastructure and to the regional Review team.

AMNET	Academy of Sciences of Moldova Network
ANRTI	National Agency for Regulations in Telecommunications and Informatics, Moldova
BiH	Bosnia and Herzegovina
BIHARNET	BiH Academic and Research NETwork
BPK	Banking and Payments Authority of Kosovo
CARNet	Croatian Academic and Research Network
CCNA	Cisco Certified Networking Associate
CFA	Central Fiscal Authority
CGEY	CapGemini
CIDA	Canadian International Development Agency
CIDA	Canadian International Development Agency
CIT	Commission for Information Technology, FYR Macedonia
CoM	Council of Ministers, Bosnia and Herzegovina
CRA	Communications Regulatory Agency, Bosnia and Herzegovina
DANTE	Delivery of Advanced Network Technology to Europe
DES	Department of Education and Science, Kosovo
DIT	Department of Information Technology, MPS, Kosovo
DMS	Decision Maker Survey (SIBIS)
DSL	Digital Subscribers Line
EAR	European Agency for Reconstruction
EC	European Commission
ECDL	European Computer Driving License
EMIS	Education Management Information System
eSEE Agenda	eSEE Agenda for Development of Information Society
eSEE WG	eSEE Working Group
eSEE	electronic South-Eastern Europe
EU	European Union
Eurostat	Statistical Office of the European Communities
FBiH	Federation of Bosnia and Herzegovina, one of two entities in BiH
FINA	National Finance Agency, Croatia
FMO	Frequency Management Office, UNMIK, Kosovo
FOSI-M	Foundation Open Society Institute Macedonia
FYROM	Former Yugoslav Republic of Macedonia
GDP	Gross Domestic Product
GPS	General Population Survey (SIBIS)
GSM	Global System for Mobile Communications
GTZ	German Technical Cooperation
HBS	Household Budget Survey
HIS	Health Information System
ICS	Inter-banking Clearing System, BPK, Kosovo
ICT	Information and Communications Technologies
ICT4D	Information and Communications Technologies for Development
IMF	International Monetary Fund
IMG	International Management Group
INA	South-Eastern Europe Telecommunication & Informatics Research Institute
INIMA	Institute of Informatics and Applied Mathematics, Albania
INSTAT	Institute of Statistics, Albania
IS	Information Society
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITIA	Information Technology and Internet Agency, Serbia and Montenegro
KCB	Kosovo Consolidated Budget
KEC	Kosova Education Center
KEDP	Kosovo Educator Development Project
KEK	Korporata Energjetike e Kosovës (The Power Company of Kosovo)
KFOR	Kosovo Force
KFOS	Kosovo Foundation for Open Society
KIPA	Kosova Institute for Public Administration

KTA	Kosovo Trust Agency
KTTN	Kosovo Terrestrial Transmission Network
LAN	Local Area Network
MAFRD	Ministry of Agriculture, Forestry and Rural Development, Kosovo
MAN	Metropolitan Area Network
MASIT	Macedonian Association for Information Technology
MEST	Ministry of Education Science and Technology, Kosovo
MFE	Ministry of Finance and Economy, Kosovo
MIS	Management Information Systems
MLSW	Ministry of Labor and Social Welfare, Kosovo
MOU	Memorandum of Understanding
MOUS	Microsoft Office User Specialist
MPC	Ministry of Public Services, Kosovo
MTC	Ministry of Transport and Communications, Kosovo
MTI	Ministry of Trade and Industry, Kosovo
MW	Microwave
NACE	Statistical classification of economic sectors in the EU
NAICS	North American Industry Classification System
NATO	North Atlantic Treaty Organization
NGO	Non Governmental Organization
NREN	National Research & Education Network
NSI	National Statistical Institutes
OECD	Organisation for Economic Co-operation and Development
OSCE	Organisation for Security and Cooperation in Europe
PCP	Primary Care Physician
PDH	Plesiochronous Digital Hierarchy
PIAP	Public Internet Access Point
PISG	Provisional Institutions of Self-Government, Kosovo
POE	Publicly owned Enterprises
POP	Points of Presence
PTK	Post and Telecommunications of Kosovo
QoS	Quality of Service
R&D	Research and Development
RS	Republika Srpska, one of two entities in BiH
SCG	Serbia and Montenegro (Srbija i Crna Gora)
SDH	Synchronous Digital Hierarchy
SEE	South-Eastern Europe
SEECP	South East Europe Cooperation Process
SEEREN	South East European Research and Education Network
SETA	Southeastern Europe Telecommunications Academy
SIBIS	Statistical Indicators Benchmarking the Information Society
SIOL	Slovenia On-line (ISP)
SME	Small and Medium-sized Enterprises
SOE	Socially owned Enterprises
SOK	Statistical Office of Kosovo
SRCE	University Computing Centre, Zagreb, Croatia
SRSG	Special Representative of the UN Secretary General, UNMIK, Kosovo
TANJUG	National Information Agency, Serbia and Montenegro
TCK	Telemedicine Centre of Kosova
TERENA	Trans-European Research and Educational Networking Association
TFMC	Theatre Frequency Management Cell, KFOR
ToR	Terms of Reference
TRA	Telecommunications Regulatory Authority
TSS	Transitional Support Strategy
UMTS	Universal Mobile Telecommunications System
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children Fund
UNMIK	United Nations Interim Mission in Kosovo
UNV	United Nations Volunteers
USAID	United States Agency for International Development
VAT	Value Added Tax
VC	Video Conferencing
VET	Vocational Education and Training
WAN	Wide Area Network
WSIS	World Summit on the Information Society
WUS	World University Service Austria

Executive Summary

This report presents the status of ICT sector in South-Eastern Europe (SEE) region (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Moldova, Serbia and Montenegro - Kosovo, Montenegro and Serbia). It is aimed to provide the support to the policy and decision makers for Information Society related national policies and strategies.

The ICT Sector Regional Status Report provides a review and analysis of existing policies and strategies impacting the ICT sector. It also provides an in-depth analysis of major Information Society development pillars:

- Legislation, Policy and Regulatory Environment
- ICT Infrastructure and Services
- E-Governance
- ICT for Business and e-Business
- E-Education
- E-Health
- ICT Industry

At the very beginning, the report presents the major issues related to ICT policies and strategies development, as well as the main legislative regulation, which is a framework of all ICT related activities. In that respect, countries have mostly developed basic strategic papers and an increasing number of related laws and regulations are being formulated. It can be expected that all the important legislation will be adopted within next one or two years. The liberalization of the telecommunication sector has not been completed yet, but it is the trend.

However, infrastructure is insufficient to provide the acceptable penetration rates and cheap usage of the modern and broadband communication technologies. Nevertheless, Internet services that are not liberalized completely are offered in different ways- with the exception of Croatia which has an Internet penetration of about 30%, all other SEE countries currently have an Internet penetration of less than 15%.

This problem is not only related to the infrastructure, but it is also connected with the poor economic power of citizens and business.

The question arises whether the small number of on-line users is the reason for the poor offer of electronic solutions as e-Commerce, G2C, G2B, e-education, e-health and others, or the benefit of these solutions with this kind of Internet penetration would be insignificant. However, the lack of functional electronic signature usage due to the legally incomplete area is making the situation even harder.

Still, even in this situation, SEE countries represent an ICT market with high potential. The companies offering IT services are constantly improving their services, promotion and appearance on domestic and larger markets abroad.

Slowly but steadily, ICT sector is making itself a significant factor in the improvement of competitiveness and growth in each of SEE countries.

1. INTRODUCTION

1.1. THE ICT SECTOR STATUS REPORT

The eSEEurope is a regional initiative founded by the Special Coordinator of the Stability Pact for South Eastern Europe and supported by UNDP. The main aim of eSEEurope is to better integrate SEE countries into the global, knowledge-based economy by regionally supporting the development of information society.

The eSEE Initiative was launched in Istanbul in October 2000 and constituted in January 2001 with Sweden as Chair, and Croatia followed by Macedonia as co-Chair. In effort to reinforce regional ownership and to inject the Initiative with new momentum, the Chairmanship was transferred to FR Yugoslavia, while eSEE Secretariat is being officially hosted in Sarajevo by UNDP Country Office BiH since February 2002.

On October 29, 2002, the member countries of the Stability Pact for SEE: Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Moldova, Serbia and Montenegro, signed a basic document for IT development activities in their region. In order to address the challenges of Information Society development, the international agreement "eSEEurope Agenda for the Development of the Information Society" (eSEE Agenda) was accepted at the Telecommunications for Development conference in Belgrade.

Within the framework of eSEE Agenda, the member countries accepted the obligation to develop and implement national ICT Strategies. As one of the important steps towards the implementation of eSEE Agenda, the ICT Sector Status Report had to be prepared. It gives an overall situation overview and provides support to the policy and decision makers for Information Society related national policies and strategies.

The ICT Sector Status Report is aimed to:

- Review and analyze the existing policies and strategies impacting the ICT Sector;
- Gather evidence of harnessing ICT for development and information society in the SEE region;
- Track progress in building the foundations for the information society;
- Identify, collect and codify know- how available in the South Eastern Europe in the area of ICT for Development and Information Society.

The ICT Sector Status Report has been prepared on the basis of 8 reports, which present the status of ICT sector in each of the eSEE Initiative member countries (there are 6 countries, but 3 separated reports have been prepared for Serbia and Montenegro- for Kosovo, Montenegro and Serbia).

The ICT Sector Status Report provides an in-depth analysis of major Information Society Development Pillars including the description of ICT Sector related projects. In addition, the report can serve as the basis for a more detailed analysis of individual ICT sectors. In this context, it also suggests relevant set of indicators for benchmarking the status of information society development.

The most recent data source for this Report was field research conducted from March through May, 2004 and implemented as a joint project of the eSEEurope Secretariat, United Nations Volunteers and United Nations Development Program in Bosnia and Herzegovina.

The UN Volunteers (UNV[4]) supported the research process through 13 National UN Volunteers (NUNV) who acted as National Project Focal Points for assessment in each respective geographic area. NUNV`s work was supported by groups of interviewers of OneWorld, SEEYN and external polltakers and by a National Consultant who compiled the ICT report for each respective country/area.

The aim behind the research was to identify the specific information and to gain insight into the pressing needs with regards to key ICT related policies, projects and programs in government and public institutions, international organizations, education domain, business sector and civil society.

Total of 1368 respondents from Albania, BiH, Croatia, FYROM, Moldova, and Serbia and Montenegro were interviewed. Drawing on clear and detailed recommendations, targeted institutions were selected locally in cooperation with UNDP Focal Points, NUNVs, National Consultants and editors of the OneWorld SEE and expert network. The list was chosen to represent the most indicative institutions and firms, while making a proportionate coverage ratio of the cities and in-country areas, wherever possible. The research process was conducted by combining methods of face-to-face and telephone interviews, postal and e-mail correspondence.

In the process of Country Report creation, various supplementary data sources have been used by National Consultants, including the existing assessments, reports, publications and official institutional sources.

Additional important data source was "Communication Infrastructure Assessment - eSEE Countries" prepared by INA SouthEastern Europe Telecommunications & Informatics Research Institute from Greece. That report provides an excellent overview of the telecommunication infrastructure and related regulatory environment within the SEE region. The authors appreciate the support provided by INA.

The authors are also grateful for data sources provided by UNDP Country Offices; especially information collected for eReadiness Assessment reports prepared as a pioneering work in the field during 2002 and 2003.

The opinions expressed and arguments used in this report are the sole responsibility of the authors and do not necessarily reflect those of the respective governments, UNDP or eSEE Initiative.

The authors are also grateful for data sources provided by UNDP Country Offices especially data collected for eReadiness Assessment reports prepared as a pioneering work in the field during 2002 and 2003.

The opinions expressed and arguments used in this report are the sole responsibility of the authors and do not necessarily reflect those of the respective governments, UNDP or eSEE initiative.

[4] The UN Volunteers programme manages two volunteer initiatives that can support the capacity building dimension of Information Society development in South-E Europe: the UN Information Technology Service (UNITeS - www.unites.org) and the Online Volunteering service (www.onlinevolunteering.org). Through both initiatives, volunteers help individuals, communities, and organizations benefit from Information and Communication Technologies (ICT), once the issue of access has been solved.

1.2. PREPARATION PROCESS

A.The list of the activities over the period
December 2003 - May 2004

A.1. preparatory phase: December 1st -March 20th 2004

· December 2003 to January 31 2004 included:
- ü Circulation of an official proposal with project description of the UNV-UNDP Regional Project, and other supportive documentation to the UNDP COs/Field Offices in each targeted country/area within SEE (December 8th 2003)
- ü Establishment of the work relationship with the ICT Focal Points in each UNDP CO
- ü Commencement of preparations for the recruitment procedure of the NUNVs/Local Experts

· February 6th -March 6th 2004 included:
- ü Official visits aimed at presenting the project details, dynamics and strategy combined with an interviewing process of the most suitable candidates for NUNV and Local Expert positions. Visits were conducted by e-SEE Secretariat and UNV-UNDP Regional Project Operations Manager as per following schedule: Albania: January 15-18 2004; Serbia & FYROM: February 5- 6 2004; Montenegro & Croatia: 11- 12 February 2004; Moldova: March 4-6 2004;

· March 7th- March 20th 2004:
- ü 2 day preparatory meeting: An Exchange of Existing Practices and Workshop on the ICT Sector Status Report (March 11&12th 2004) in Sarajevo, BiH aiming at:
  - Á Recapitulation of the common understanding of the objectives and expected results of the ICT Sector Status Report among all parties;
  - Á Underling the roles of the UNDP CO partners, including UNDP Focal Points, National UNVs/Experts, National Consultants and One World editors;
  - Á Differentiation of the two major outputs of the ICT Sector Status Report;
  - Á Presentation of the specific project fiches:
  - Á ICT Sector Status Report Questionnaires/Discussion Guides;
  - Á Environmental scanning;
  - Á Interviews and data collection;
  - Á Review and analysis of collected data;
  - Á Creation of Country Reports;
  - Á Fashioning of the ICT Sector Status Report;
  - Á Stressing the importance of harmonizing dynamics of the parallel processes in participating countries - regional team building;
- ü Distribution of the questionnaires for the Government, Education, Business, International and Civil Society Sector and data entry applications to the UNDP offices (March 19th 2004);
- ü A preliminary research on the ICT status in all targeted countries/areas including web resources, recent surveys, and similar projects, locating target groups and preparation of directories with contact information of institutions;
- ü Translation of the questionnaires from English to local languages and preparation of the supplementary documents. Supplementary documents include official letter by each UNDP Resident Representative and memo with detailed instructions and project related information;
- ü Pilot phase: testing the time needed for performing a single interview and examining the wide ranging spectrum of responses
- ü Establishing methodology adjusted to the specifics of each UNDP office: based on the pilot phase

A.2. Survey Process: Data Collection, Data Entry: March 20th- May 9th 2004

The following table represents the research results in Albania, BiH, Croatia, FYROM, Moldova, Serbia and Montenegro including Kosovo (March 20th -May 9th 2004)

Type of targeted Sectors
Number of reached respondents in each targeted country/area

	Albania	BiH	Croatia	FYROM	Serbia	Montenegro	Kosovo	Moldova
GOVERNMENT	8	30	31	24	32	13	26	8
CIVIL SOCIETY	40	32	67	11	71	5	66	71
EDUCATIONAL	4	29	36	19	21	11	14	16
BUSINESS	20	69	100	51	73	49	61	101
INTERNATIONAL	28	36	28	22	8	18	14	4
TOTAL	100	196	262	128	205	96	181	200
GRAND TOTAL	1368							

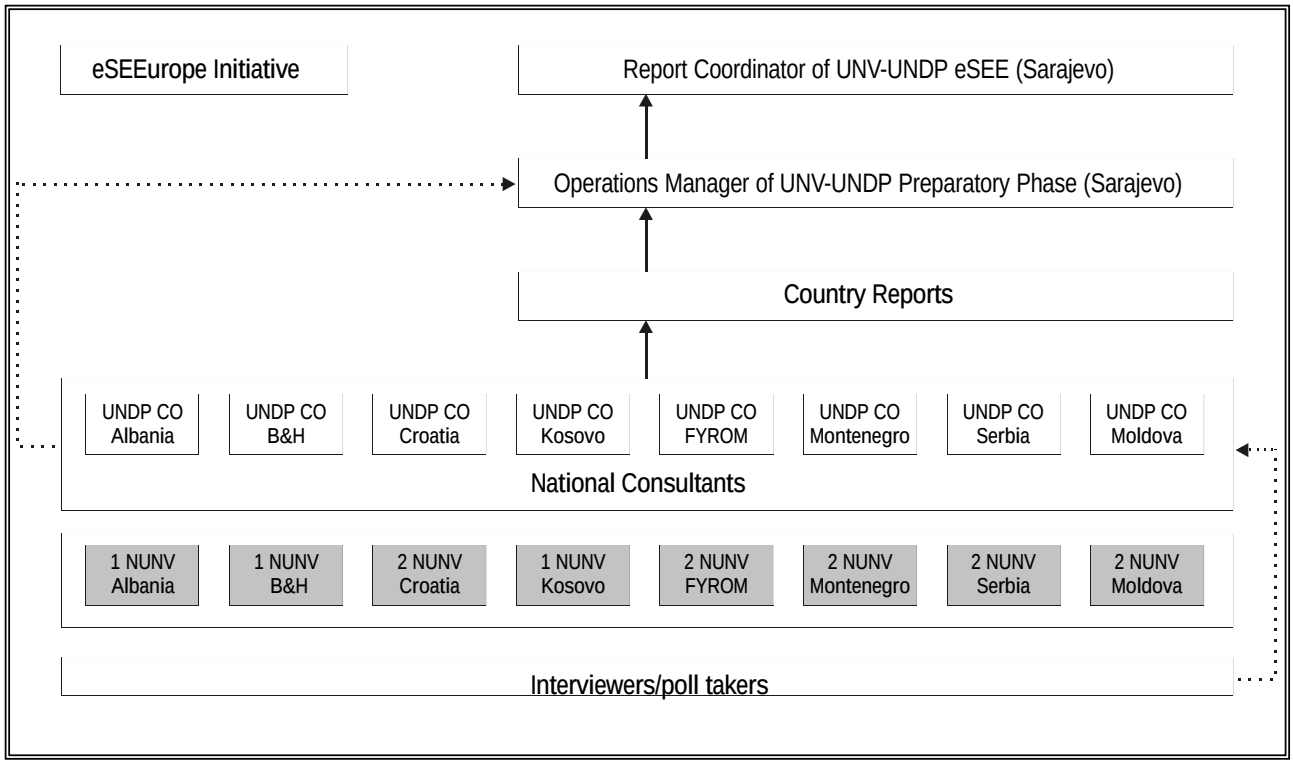
Challenges: (i) Tight deadlines; (ii) Easter holidays, other unexpected circumstances such as two rounds of presidential elections in Macedonia, due to which many NGOs involved in the election process as observers were not available to take part in ICT Sector Status Report survey; (iii) Virus flood in the query period, servers breaking down, exchanged messages with attachments automatically being deleted, case with almost all UNDP offices; (iv) Inaccessibility of decision-makers; (v) Unwillingness of institutions to cooperate: there were a couple of cases of open refusal to cooperate with the UNDP by private companies. Delays were experienced in questionnaire submission; (vi) Security status: the managerial boards of several banks decided not to answer the questionnaire for, what they rated as, information security reasons.

B. e-SEE ICT Sector Status Report Project Team

B.1. The Team Members:

- The Head of the e-SEEurope Secretariat
- The Report Coordinator of the ICT Sector Status Report
- Operations Manager of the UNV-UNDP Regional Project
- National Consultants (one per each respective country/area)
- UNDP Focal Points (one per each respective country/area)
- National UNVs/Local Experts (one and/or two per each respective country/area)
- Poll-takers

B.2. Organigramme of the eSEEurope ICT Status report implementation structure



2. REGIONAL PERSPECTIVE

2.1. ICT/IS POLICIES AND STRATEGIES

To address the challenges of Information Society development, the member countries of the Stability Pact for South Eastern Europe (Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Moldova, Serbia and Montenegro) formally associated themselves with European IT development process defined in the eEurope and eEurope+ Action plans. On October 29, 2002, at the Telecommunications for Development conference in Belgrade, SEE countries signed and accepted international agreement "eSEEurope Agenda for the Development of the Information Society" (eSEE Agenda) as a basic document for IT development activities in their region. This agreement is in line with eEurope 2002 and 2005 Action Plans and eEurope+ plan of candidate countries and represents the confirmation of SEE countries` commitment to develop information societies in their economies in accordance with European models and standards. This document is also endorsed by member countries at the March 2003 South East Europe Cooperation Process (SEECP) Summit.

Within the framework of eSEE Agenda, the member countries accepted the obligation to develop and implement national ICT Strategies. Status of development and/or implementation of national ICT/IS Policies and Strategies are shortly presented in the following table:

Country/Region	Status	Implementation
Albania	A National Strategy for Development of ICT accepted by Government at the beginning of 2003.	Implementation is lagging back due to lack of necessary attention by Government. The lack of motivation to implement the strategy is the main obstacle.
Bosnia and Herzegovina	Policy, Strategy and Action Plan for information society development prepared by Ministry of Transport and Communications and UNDP. Formal acceptance by Council of Ministers expected before the end of 2004.	Although Policy and Strategy still not formally accepted, there are important state level initiatives, programs and projects related to IS development.
Croatia	Strategy of Development of the Republic of Croatia - "Croatia in the 21st Century" prepared in 2000.	Having created strong environmental conditions for e-developments (legislative, policy, regulations), strong developments of ICT infrastructure and services, creating the climate for decreasing of digital divide, fostering the e-government developments, developing open and competitive economy, Croatia is decreasing the gap on the way to eEurope.
Macedonia	Official National ICT Strategy not formally developed and accepted, but there is strategic document adopted by government in 2002: "e-Declaration 2002".	Recommendations for faster development of an information society and digital economy in Macedonia still not well implemented.

Country/Region	Status	Implementation
Moldova	IS Building Policy is adopted by the Government on June 8, 2004. IS Building National Strategy is to be adopted by the end of 2004.	On March 19, 2004, the President of Moldova issued a Decree that declared the IS as a national priority. However, still no major implementation results visible.
SCG - Kosovo	Policy and Strategy not formally developed and accepted.	Several initiatives, mostly dependent upon involvement of international organizations and agencies.
SCG - Montenegro	Strategy and Action Plan of Information Society prepared and Draft of National Strategy adopted on June 17, 2004.	In accordance with the Strategy, there is governmental body and some initiatives related to IS development.
SCG - Serbia	Policy has been completed and published for comment, but unfortunately Government still has not taken it into consideration. Strategy has not been finished or adopted yet.	The most of the activities defined by eSEE Agenda are under development but have not been implemented.

2.2. LEGISLATION, POLICY AND REGULATORY ENVIRONMENT

The overall situation in the region can be described as "transitional". All country legal systems are introducing new laws and regulations, and the overall environment is becoming increasingly appropriate for Information Society development.

The status regarding major laws, regulations, coordination and regulatory bodies is presented in the following table.

Relevant Laws and Regulations; Institutional infrastructure	Albania	BiH	Croatia	Macedonia	Moldova	SCG Kosovo	SCG Montenegro	SCG Serbia
Law on Telecommunications	+	+	+	+	+	+	+	+
Protection of personal data	+	+	+	+	+[5]	-	-	+/-[6]
Protection of consumers	-	+	+	+	+	-	-	-
Copyright and similar rights	+	+	+	+	+	-	-	+/-[7]
Access to information	+	+	+	+/-[8]	+	-	-	-[9]
Electronic signature	-	+/-[10]	+	+	+/-[8]	-	+	+/-[11]
Electronic commerce/business	-	-	+	+	+/-[12]	-	-	-
Amended Criminal Code	-	-	+/-[12]	+	?	-	-	+
Independent regulatory body of telecommunications	+	+	+	+/-[13]	+	+/-[14]	+	+/-[15]
Government structure(s) dedicated to IS development	-	-	+	+	+	-	-	+[16]

Legend:

+	Already passed/introduced/active
+/-	Exists, but not effective; Preparation process is underway
-	Not established/passed/introduced; still no major activities
?	Unknown

NOTE: *Not all policies, laws, regulations or organizations can be treated the same way since different countries have different context. More details can be found in chapter: "In-Depth Description of ICT Environment".*

[5] Included in Law on access to information
[6] Exists on a Federal level, but not implemented by the member states
[7] Exists on a Federal level, but not implemented by the member states
[8] Draft - Expected to be adopted
[9] The drafted law is compliant to international standards
[10] Only in one out of two entities in BiH (Republika Srpska), but not enforced
[11] Waiting to be ratified in the Parliament
[12] "Convention on Cyber crime"
[13] Not independent; "Telecommunications Directorate" under the Ministry of Transport and Communications
[14] Not independent; declared as independent, but organizationally the part of government
[15] Introduced by Law on Telecommunications, but still not established
[16] Formally established but non-functional

2.3. READINESS FOR INFORMATION SOCIETY

The term eReadiness is used here to denote the degree to which a given society, social group or organization is aware of, has adjusted to and is prepared to use the new information and communication technologies.

It is important to assess it in terms of defining and implementing of national development strategy. The aim is to develop awareness of the challenges and comparative advantages and deficits and to encourage development of the capacity to tackle them and to exploit the new possibilities.

There are different approaches to eReadiness assessment. Whichever approach the country adopts, it shall be implemented systematically and used consistently in time. That is the only way it can produce useful results.

This report shows that, with the exception of Croatia, actually none of the countries in the region has systematic and consistent process of eReadiness assessment[17]. There are neither governmental nor non-government institutions that are dedicated to long-term assessment of country's eReadiness.

Some existing external assessments also do not provide clear picture and do not cover the region well. For example, Global Information Technology Report[18] that includes assessment for more than 100 countries covers only Croatia, Macedonia and Serbia. Also, the Economist's "2004 eReadiness rankings report"[19] does not include any of the countries from SEE region - it is interesting that this global report does not include the SEE region at all.

The overall assessment is not very encouraging but it is hard to measure exact level of eReadiness in the region, especially changes and trends in last few years. Since the assessment of country's eReadiness is one of the most important inputs for ICT strategy formulation and implementation, it leads us to conclusion that SEE countries need to significantly improve their ability to assess their eReadiness status.

2.4. ICT INFRASTRUCTURE AND SERVICES

The basic ICT infrastructure that is considered here includes:

- Fixed telephony,
- Mobile telephony, and
- Internet access

It seems that the overall status of fixed telephony is relatively good within the region as a whole. The penetration is presented in the following table:

Country/Region	Penetration	Note
Albania	39.00%	Calculated per average household of 5 persons
BiH	>95.00%	Calculated per average household of 4 persons
Croatia	>95.00%	
Macedonia	>95.00%	
Moldova	69.2%	Calculated per average household of 4 persons
SCG/Kosovo	26.9%	Calculated per average household of 6 persons
SCG/Montenegro	62.0%	
SCG/Serbia	>95.00%	

However, the penetration is not the indicator of quality of services. Almost all fixed telephony operators are in monopoly situation, and the quality of services varies.

17 UNDP CO in BiH has done some preliminary work in respect to eReadiness Assessment

18 Global Information Technology Report, The World Economic Forum and INSEAD, 2002/03, and 2003/04

19 2004 eReadiness rankings, Economist Intelligence Unit and IBM, 2004.

The mobile networks and Internet Service Providers are in expansion all over the region:

Country/Region	Mobile telephony operator(s)	ISP's
Albania	AMC Vodafone "Eagle"	15 active ISP's
BiH	GSM BiH MOBI's Eronet[20]	More than 40 ISP's
Croatia	HTmobile VIPnet	7 major ISP's
Macedonia	Mobimak Cosmofon	8 major ISP's
Moldova	Moldcell VOXTEL	More than 70 ISP's
SCG/Kosovo	VALA900 Mobtel	4 major providers
SCG/Montenegro	ProMonte Monet	2 major ISP's
SCG/Serbia	Mobtel Mobilna Telefonija Srbije	More than 60 ISP's

Each of the countries has more than one mobile telephony operator. That competitive situation has positively influenced the market, with the exception of Bosnia and Herzegovina that has three active operators, but territorially almost totally divided (which means that real competition is not present). Typical situation is also: major, state owned telecom operators own or control major ISP's, which very often means that these ISP's have better position regarding the usage of infrastructure. That market is still not well developed, the prices are still relatively high, so very often that situation represents major obstacle to for making the Internet penetration much closer to its potential.

2.5. DIGITAL DIVIDES

Digital divide can be defined as "the gap between individuals, households, businesses and geographical areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies ad to their use of the Internet for a wide variety of activities."[21]

There are various methodologies to address this issue, but whichever we adopt, the foundation for any serious analysis are reliable data. The first fact that this report shows is the chronic lack of reliable data within the region. Some countries have better situation for some relevant data sets, but each of the countries is experiencing the serious lack of even basic statistics. There is no systematic and institutionalized way of tracking the basic indicators for digital divides. One of the priorities for eSEE initiative shall be setting up such system(s).

However, there are some indicators that can give us, albeit probably not precise answers, but general overview of situation in the region. These indicators cover mostly the access issues, while the other important aspects, such as digital literacy, local content, and economic development, are not covered well. There is almost no reliable data related to understanding clear divides in these aspects per population age, residence, and similar.

[20] Operating without the licence.

[21] "Understanding the Digital Divide" OECD, 2001.

In general, the access to basic ICT is presented in the following table:

	TV Set		Satellite TV Receiver		Phone		Computer		Internet	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Albania	95.1%	85.8%	23.1%	23.5%	39.0%		2.7%	0.3%	n/a	n/a
BiH	97.0%	89.0%	19.0%	16.0%	91.0%	70.0%	10.0%	3.0%	11.0%	0.02%
Croatia	n/a	n/a	n/a	n/a	>95%		n/a	n/a	30,0%	8,9%
Macedonia	n/a	n/a	n/a	n/a	>95%		avg. 9.2%		avg. 6%	
Moldova	>95%		n/a	n/a	>95%	40.4%	n/a	n/a	n/a	n/a
SCG/Kosovo	>95%		n/a	n/a	26.9%		15.9%		3.0%	
SCG/Montenegro	n/a	n/a	n/a	n/a	62.0%		9.9%		15.0%	
SCG/Serbia	n/a	n/a	n/a	n/a	>95%		16.0%		14.0%	

As we can see, much of the data is missing. However, it is quite clear that access to computers and the Internet is not good, especially in rural areas (for countries that do not have data on urban/rural divide there is overall perception that rural areas are not well covered).

2.6. E-GOVERNANCE

In its simplest sense, Electronic Governance (e-Governance) refers to the use of information and communication technologies for the processes of government and public administration. The notion of e-Governance incorporates all those processes and structures by means of which ICT can be employed by government to enable:

- Administration of government (e-Administration) and delivery of services to the public (e-Services) -- these generically constitute Electronic Government (abbreviated e-Government).
- Informing, vote-enabling, representation-enabling, consulting and involving the citizenry in, among others, broad consensus making in society in matters pertinent to decision making in political, social and economic priorities in government. This constitutes Electronic Democracy (abbreviated e-Democracy);

Together, these two components ensure that a government obeys democratic norms and provides trusted services.

Having in mind this operational definition of e-Governance, the SEE region seems to be in relatively early stages of development. The status of typical governmental information systems and e-Governance systems implementation is given in the following table:

Typical governmental information systems and e-Governance Systems	Albania	BiH	Croatia	Macedonia	Moldova	SCG Kosovo	SCG Montenegro	SCG Serbia
Electronic Citizen Registry	no	yes	yes	no	yes	yes/no[22]	yes/no[23]	no
Public Expenditures (Treasury/Finance)	no	yes	yes	no	yes	no	yes	no
Taxation Authorities	no	no	yes	no	yes	no	yes/no[24]	no
Customs Administration	no	yes	yes	no	yes	no	yes/no[25]	no
Network/communication infrastructure, dedicated to e-Governance systems	no	no	yes/no[26]	no	yes[27]	no	no	no
Judicial systems	no	no	some[28]	no	no	no	yes	no
Electronic Registration of Companies	no	no	no	no	no	no	no	yes/no[29]
Web sites of ministries/Web portals	Some Web portals relatively well developed, but mostly not well connected to back-end systems							
E-Governance systems at local level/ portals for citizens	Only few positive examples of municipalities having implemented elements of eGovernment systems could be found, mostly in BiH, Croatia, and Macedonia							
E-Democracy systems	Almost no positive examples							

[22] Needs to be fully implemented
[23] The old system operational, but needs to be fully replaced
[24] Implementation in progress
[25] First phase implemented
[26] Implementation at early stages
[27] Government structures "well equipped and networked" - however, status of infrastructure not clear
[28] Commercial Court Register exists
[29] Implementation in progress

In addition to these typical systems, there are some additional systems that are fully or partially implemented, such as:

- National Multifunctional Smart Card - in Croatia, implementation to be launched
- Registry of government owned Properties - in Croatia
- Intranet Payroll System - in Croatia, pilot project in progress
- Set of Financial Registers - in Croatia (FINA)
- Internet based Municipal document management system - in SCG - Kosovo
- HRM in the Civil Service - in SCG - Serbia, implementation in progress

The overview of state level e-Governance services shows that Citizen Registry and systems supporting important state financial transaction (treasury, customs, and taxation) are priority. Experiences of countries that have already implemented such systems (for example, Croatia and partially BiH) are very positive. These systems, especially the Citizen Registry, are fundamental for any other development.

The serious lack of electronic services for citizens on local level is also obvious. It seems that no country has serious state-level initiative or project for development of local level electronic services (back-end systems and web portals). That is to be also one of the highest priorities.

It is clear that all countries are almost totally lacking e-Democracy systems. This seems to be mostly the consequence of general status of democratic reforms - transparency and increased participative role of citizens seems not to be the priority to governments.

2.7. ICT FOR BUSINESS AND E-BUSINESS

Since the usage of ICT in business and e-business (extensive use of ICT as the key enabler of business), cannot be regarded as an isolated phenomenon, but rather as an expression of the wider process of digitalization of the economy as a whole, the overall status within the region can be denoted as non-developed.

In comparison to developed western countries, the first significant difference is the lack of cyber space market. Potential customers are mostly not present on the Internet. In such environment, the Internet/Intranet technologies are mostly used for data retrieval and communication (internal and business-to-business). There are many companies having Internet based presentation and marketing, but very few providing services such as selling or other kinds of business-to-customer E-commerce models.

However, many good ideas and solutions are trying to survive. It means that primary issue is not the potential of e-business and the will of the business to explore it, but the issue of e-business enablers:

Telecom operators/ISPs

Most of them have monopolistic behavior and considerably high price of services. Services have long delivery time and relatively low quality. Huge, state owned telecoms often favor own ISPs. Such behavior slows down the spread of secondary ISPs network. It means that Internet penetration is significantly reduced, and that is the major obstacle for business to spread in cyber space.

Even though the most of the countries have well-developed basic infrastructure, there are different examples, such as Kosovo.

Postal operators

Any e-based business depends heavily on reliable postal services. Most of the countries have postal services that are not trusted for valuable shipments and no payment-on-delivery services are available.

Financial infrastructure

All of the countries within the region have mainly cash-based society (that can be said even for Croatia who has the most developed financial infrastructure). For example, in the first half of 2003, only 8.8 % of bank transactions in Moldova were non-cash, and the rest being operations of cash withdrawal. The e-business cannot develop without basic e-banking services - they are not available to satisfactory level. Good examples of Internet/electronic payments are under development.

However, it seems that banking sector is the most developed one in almost all countries. All of he banks use ICT for doing business, but it does not mean that sophisticated systems are in place. Albania is good example. Only two banks in Albania do not have Internet access, while 48% of Albanian banks have Internet based systems. However, Internet-based bank transactions are implemented only by one bank. It means that banks are computerized, but do not offer e-banking services. Similar example is Bosnia and Herzegovina. All banks are computerized, but only several banks offer credit cards and have ATMs, and only one bank have some real e-banking services related to real transactions.

Government/Legislation

There is significant lack of adequate legislation that would legally regulate framework for conducting the electronic business. However, also important, there is lack of clearly defined supportive measures for the development of e-business. In addition, there is insufficient coordination of private sector, scientific and educational institutions to comprehend necessary measures to stimulate information on companies and easier access to Internet. Up to the some point, Croatia is the exception - needed legislation is mostly adopted and the state has done many steps in order to enhance the business environment.

The importance of legislation is very visible. For example, many companies have technology and e-business solutions, but the lack of legislation related to Electronic Signature is preventing them to start using it (for example, Macedonia and BiH). There are counter-examples - despite the lack of adequate legislation, many electronic shops in Moldova and Serbia are offering products and services with electronic payment. Business cannot wait for slow state reaction - it must expand or it will not survive.

2.8. E-EDUCATION

The basic facts on the elementary and secondary level of education show that the ratio of computers to pupils varies significantly from 20-30 in Croatia and BiH, to 90 in Montenegro. The available data seems to be imprecise. Governmental structures mostly do not have clear statistics. Some of data is simply not available, or has been provided by ad hoc field researches that give only estimated values. In addition, even a good ratio of computers to pupils does not mean that computers are used in the teaching process (most of them are used for administrative purposes), or that existing computers are useful at all (there are many obsolete machines, even Intel 286/386 generation).

Therefore, the first conclusion is similar to that in many other sectors - we need better statistics and indicators to assess the real status. However, according to available data, it seems that all countries in the region need some kind of "Computer-for-all" programs for elementary and secondary schools. It is obvious that current way of purchasing the equipment partially is neither effective nor efficient (for example, during 1997-98, Moldova has equipped 821 schools with computer labs, but these labs have not been upgraded ever since - it means that they are not functional anymore). The most positive case of systematic way of equipping the schools is the Croatian Ministry of Education and Sport. Some other countries also have important initiatives related to schools equipping, such as E-School.mk initiative in Macedonia.

In terms of connection to Internet, only Croatia has relatively good position having all schools connected to Internet. That status shall be the standard for all the countries in the region. Probably the worst situation with the connectivity is on Kosovo where the most of the schools are not connected and it seems that Ministry of Education Science and Technology is not considering that issue as a priority at all.

The situation with academic and research networks is presented in the following table:

Country	NREN	Status	Operational external connections	Usable backbone capacity (Mbps x km)	Notes
Albania	Albanian Academic Network (ANA)	Governed by Ministry of Education and Science and the Academy of Sciences of Albania	GRNET/ SEEREN (2 Mbps)	National backbone does not exist	Many institutions are connected to private ISPs; Serious improvement expected through SEEREN initiative
BiH	Academic and Research Network of Bosnia and Herzegovina - BiHARNET	It formally exists, although not accepted on the whole territory of BiH. Factually, NREN does not function.	None	National backbone does not exist	Since NREN does not function, institutions are connected to private ISPs; Not included in SEEREN initiative
Croatia	Croatian Academic and Research Network (CARNet)	Fully funded by the Ministry of Science and Technology	CIX (100 Mbps) GEANT(1200 Mbps) Commercial Internet (622 Mbps)	220,100	Speed of connection ranges from 2 to 622 Mbps All higher education institutions connected to NREN
Macedonia	Macedonian Academic and Research Network (MARNet)	Indirectly financed by government - MARNet member institutions pay from their own sources for the internal connectivity to NOC	Commercial Internet (1 Mbps)	National backbone does not exist	Existing SEEREN project aiming the connection to GEANT between 2 and 34Mbps
Moldova	Research and Educational Network Association of Moldova (RENAM)	Independent legal entity, indirectly controlled by government - governance by the research and education community which in itself is (largely) government-funded	GEANT (8 Mbps) Commercial Internet (6 Mbps)	30	Universities are connected to MARNet
SCG	Academic And Research Network of Serbia and Montenegro (AMREJ)	Currently organized as a special project funded by Ministry of Science, Technology and Development,	GRNET/SEEREN (34 Mbps) Commercial Internet (34 Mbps)	140,050	Institutions mostly connected to NREN All Universities in the country are connected to the Academic Network

As we can see, current bandwidth speeds are relatively modest, with the exeption of Croatia. Most of the countries expect serious improvement through SEEREN initiative[30].

Usage of computer equipment at the universities is not so bad if we look at the statistics. Many universities have enough computers, networking technologies, even highly sophisticated installations (such as implementation of National Grid for Learning in Croatia), but we need to ask some other questions, such as:

- What is the quality of the most of the equipment?
- Is the equipment concentrated in "elite" or "luckier" institutions, or it is distributed more evenly?
- How is it used?
- How is it integrated into research and educational processes?

Even preliminary analysis does not give very optimistic answers. For example, some technical faculties at the Tirana University are relatively well equipped, but the total number of computers (about 300) at a university that has more then 1,000 teachers clearly indicates serious lack of equipment. Another extreme example is the E-Net distance-learning center at the University of Sarajevo. It is one of the most sophisticated video-conferencing centers in the whole World Bank GDLN network, but the University of Sarajevo University cannot be qualified as a university with systematically developed distance learning; quite opposite, the most of the faculties are not using the equipment for any electronically enhanced teaching.

Integration of ICT and new ways of doing teaching and research is also important. Although being conditio sine qua non, the equipment itself cannot produce serious positive impact. Electronically enhanced learning, including distance learning, is not present in the education systems within the region. Existing programs related to big corporations (such as Cisco Academy and Microsoft Certified programs that are present in every country) are relatively successful, but not integrated into national education systems.

The most of the libraries in the region do not have sufficient ICT support. Modern library has new role in the society and new ways of functioning, and that cannot be achieved without serious ICT support. In addition to basic systems, shared cataloguing is probably the most important feature. One regional initiative must be mentioned in that context. The COBISS initiative[31] is the only regional initiative to provide librarians the functional shared cataloguing system. It includes Slovenia, BiH, Macedonia, and Serbia and Montenegro.

However, even though promising, COBISS is not very successful. On the contrary, it has made disappointing progress. There are several problems related to that. It seems that the most important issue is the result of unclear ownership with respect to COBISS software developed by the Institute for information sciences in Maribor, Slovenia. The software was developed at a time when Slovenia was the part of former Yugoslavia. All the republics of the former Yugoslavia financed its development.

A good example of development initiative in libraries can be found in Croatia. The Ministry of Science and Technology provides funding for the procurement of software and on-line databases for university libraries within the project Scientific Information System. The aim of the project is to create a common network integrating all higher education institutions, primary schools, secondary schools and public libraries using standardized computer equipment and software. However, advantage that Croatian libraries have, that makes this project feasible, but that other countries do not have, is the fact that all libraries are connected to the Internet through CARNet, Croatian NREN. This example illustrates one more time the importance and urgency of further NREN development in all countries in the region.

Education and ICT are not related only by usage of ICT in education process and education institutions. In the context information society, the education system must become a service to citizens. Living in the information society requires every citizen to have some of so far unknown skills. In such a society, the education system must provide to citizens something more than just basic literacy and traditional knowledge. Apart from introducing into curricula the new knowledge and skills related to ICT, citizens must acquire during their schooling, the education system must transform itself to provide continued supplementation of such skills and knowledge through the concept of life-long learning. Education system's task is to carry out continued promotion and dissemination of knowledge on the information society in different ways and inform of the importance of this transformation for the overall society development.

In terms of having the education system as a new service for information society, the most of the countries in the region simply fail to achieve that objective: children finish elementary schools without acquiring basic digital literacy; curricula in high schools is not adopted for new skills needed etc. Changing that situation is obviously related not only to pure introduction of ICT to curricula, but to overall reform of education systems.

Countries in the region are having serious gap between needs and services that education system offers. Even basic legislation is sometimes missing, such as in Bosnia and Herzegovina. Some legislation, such as regulation related to electronic books, is missing in the most of the countries in the region.

Of course, the gap between needs and offered services is more visible from the perspective of those who need services. Field research in all countries shows that business sector is not happy with the qualifications that education system offers. This is important indicator, since business is usually the most sensitive sector when it comes to needs for changes.

[30] South Eastern European Grid-Enabled eInfrastructure Development" project (SEE-GRID, http://www.see-grid.org) intends to provide specific support actions to pave the way towards the participation of the SE European countries to the Pan-European and worldwide Grid initiatives. SEE-GRID will try to ease the digital divide, in the Grid context, and release the scientific & productive talents of the region, to support Pan-European Grid efforts using the infrastructure provided by the Gigabit Pan-European Research & Education Network (GEANT) and the South-East European Research and Education Networking (SEEREN) initiative. This will allow participation of the targeted countries in Pan-European Grid Efforts in the immediate future. Research & Education Networking and Grid initiatives in South East Europe, such as SEEREN & SEE-GRID, play an important role in an area where regional unrest was hindering cooperation and economic growth till recently. The continuing expansion of the SEEREN network operation, as demonstrated recently by the establishing of the Sarajevo-Belgrade communications link, as well as the commencement of new efforts in promising science and technology areas like SEEGRID, are key examples of the sustained efforts for easing the digital divide between the region and the rest of the continent, thus paving the way for future enlargement steps of the European Union and contributing to the overall stability and peace in South-East Europe.

[31] http://www.cobiss.org/

2.9. E-HEALTH

In general, health information systems within the region are mostly outdated and paper based. Coordination is not present, and ICT is deployed in fragmented and duplicative way.

The most significant developments are:

- Albania - Institute of Public Health runs the "Alert" information system for infectious diseases, used to collect data through the country and provide statistics to Ministry of Public Health;
- BiH - Improved Health Care Finance Information System implemented in Health Care Funds (both in FBiH and RS) through a World Bank supported project;
- Croatia - Two pilot projects implemented (Primary Healthcare Information System and Integrated Hospital Information System);
- Macedonia - Integrated Medical Information Systems implemented in several institutions (Clinical Center Skopje, Medical Center Prilep, Policlinics Zelezara Skopje);
- Moldova - Center for Health Informational Resources by the University of Medicine and Pharmacy, and the Informational Center "INFOMEDICA" started the pioneering work related to e-health issues;
- SCG - Kosovo - Telemedicine Centre of Kosova has been established with the intention of providing consultation and connection between University Clinical Center in Prishtina and Regional Hospitals in Kosovo;
- SCG - Montenegro - Project Control of distribution and usage of medicines implemented in the state pharmacies;
- SCG - Serbia - Implementation of system for distribution and usage of medicines in Belgrade is in progress;

2.10. ICT INDUSTRY

The issue of ICT industry development is related to overall information society development. According to the experiences from many countries, it is much more efficient and quicker to develop many attributes of information society with parallel development of own ICT industry, as a separate production line of the total economy of a country, than to develop the IS with someone else's ICT industry. There are several benefits of this approach, in the social and economic sense. The society will have its own development and research, which provides the foundation of permanent development and advancement of the society and economy in future. Without the development of the ICT industry, the society would be destined to permanent dependence and hindrance of development.

Despite pessimistic indicators with respect to the SEE economy, the ICT industry is actually developing and spreading within the region - it is one of the drivers of the economic growth. The reason behind that lies in the fact that the ICT is not limited to only developed countries; instead, it represents global interest and the interests of all in particular. Governments of almost all countries within the region are trying to design or have designed effective policies to facilitate the use of ICT with the aim of stimulating the economic growth.

The ICT industry is growing within the region. For example, the IT market in Macedonia has increased from 37 million USD in 2000 to more then 50 million USD in 2003. In Croatia, even though the number of ICT companies has not significantly increased between 1994 and 2002 (15.76%), the gross income of these companies has increased by 300%.

In addition, the segmentation is changing. Hardware sales still dominate, but software and services are taking larger share of market (Examples: Macedonia - software application share increased from 15% in 2000 to 36% in 2003; Moldova - the average growth of sales in software industry during the period 2001-2003 was of 50%).

However, it seems that governments do not recognize these potentials. There are resources (factories, companies) that have potential, but without serious governmental stimulation, that potential cannot be developed. Governments are very often without managerial resources and available, updated and accurate data. In addition, ICT industry of all SEE countries can hardly achieve significant progress without considerable financial injections from abroad and extra efforts in domestic financial market.

Within that context, the ICT industries in SEE countries are looking for help to increase:

- Ability of domestic companies (public and private ones) to participate in the assembly, installing and maintenance of hardware for domestic needs;
- Ability of local companies to participate in the production and delivery of software for domestic needs;
- Ability of domestic companies to participate in the production and delivery of hardware and software for the needs of exports;

2.11. IMPORTANT EVENTS IN NEAR FUTURE

Year/Quarter	Event	Country
2004/3	Approval of the national Policy, Strategy and Action Plan for Information Society Development	BiH
2004/3	The third mobile operator gets license	BiH
2004/3	A meeting of the representatives of foreign donor organizations present in Macedonia with the Committee of Information Technology of the Government of the Republic of Macedonia, in order to reach an agreement for commencement of the process of developing National ICT Strategy.	Macedonia
2004/3	International conference on Information Society organized by the Academy of Sciences of Moldova.	Moldova
2004/3	2nd mobile operator selected and awarded license	SCG - Kosovo
2004/4	First drafts of missing e-legislation ready for review and adoption	BiH
2004/4	Conference "Action Plan for Information Society Development in BiH: 2005-2010"	BiH
2004/4	National programme for the integration of the Republic of Croatia into the European Union	Croatia
2004/4	Information Technology Interfaces - ITI 2004	Croatia
2004/4	CASE 2004	Croatia
2004/4	Mipro 2004	Croatia
2004/4	International INFO 2004 Fair (with the Promotion of e-Government Services Involved).	Croatia
2004/4	Parliament will adopt a set of laws aimed to improve situation in the sector (Law on Electronic Document, Law on Digital Signature, etc.).	Moldova
2004/4	Adoption on National Strategy on Information Society Building	Moldova
2004/4	Kosovo Optic Ring Project phase 1 implementation completed (Sections: Prishtina- Gjilan; Gjilan-Ferizaj, and Mitrovica - Prishtina)	SCG - Kosovo
2004/4	National Strategy for Education adopted by the Ministry of Education, Science and Technology	SCG - Kosovo
2004/4	National ICT Strategy adopted by the Ministry of Telecomm and Communications, and the Ministry of Public Services	SCG - Kosovo
2004/4	Law on electronic signature adopted by the Assembly of Kosovo	SCG - Kosovo
2004/4	Law on e-Commerce adopted by the Assembly of Kosovo	SCG - Kosovo
2004/4	Ex-Libris ALEPH 500™ integrated library system implemented in National and University Library of Kosovo (NULK)	SCG - Kosovo
2004/4	11th INFOFEST, Festival of Information Technology Achievements	SCG - Montenegro
2004/4	ADSL services commercially available.	SCG - Montenegro
2005/1	The Agency for Information Society operational	BiH
2005/2	Adoption of the Law on personal data protection	Moldova
2005/3	European Commission's opinion (avis) on Croatia's application.	Croatia
2005/3	Law on Data protection drafted and adopted by the Assembly of Kosovo	SCG - Kosovo
2005/4	Missing e-legislation completed	BiH

2.12. BENCHMARKING

This report is proof that SEE countries have not developed benchmarking procedures in accordance with European standards and norms. The data sources used here are mainly already prepared assessment reports, official data from institutions, and research results of various marketing and research firms. An additional data source was the survey on ICT Status held during the course of this project (March-April 2004). None of these data sources will be systematically available in the long term.

Benchmarking activity in regards to the development of an Information Society following eEurope and eEurope+ practices has been identified as the key element necessary to help the integration of the SEE countries into the ongoing European processes, having in mind that benchmarking activity would have two main objectives:

- Systematic monitoring of information society development for each of SEE countries, and the region as a whole
- Monitoring the fulfillment of the commitments of the eSEE Agenda by the SEE countries

Since all of the SEE countries have already started toward an Information Society, it is quite clear that the introduction of some benchmarking system is becoming urgent.

There are many possible benchmarking systems, and there are various sets of indicators to consider. This report suggests that the set of indicators chosen should have certain qualities.

- They need to be based on the findings of national ICT strategies regarding the relevance of indicators.
- They need to be relevant for most of the countries in the region
- They need to be realistic, in the sense they can be implemented
- They need be scalable, having the potential to be used to track progress on regional level

Sets of proposed indicators are based on SIBIS indicator sets, prepared by the University of Applied Sciences Solothurn Northwest Switzerland (FHSO) in the context of the IST-26276-SIBIS project ("SIBIS - Statistical Indicators Benchmarking the Information Society"). Even though SIBIS clearly states that the proposed indicators are more appropriate for developed countries, we concluded that many indicators are quite relevant for SEE countries.

Considered relevant for monitoring of...	Indicator
...The digital divide	· Divide of users of computers per various groups. · Divide of users of Internet per various groups. · Divide of home users of Internet per various groups. · Digital Divide Index (DIDIX). Calculated by SIBIS methodology.
...The overall development of information society.	· Divide of users of Internet per various groups. Included only those that use Internet for more then 2 years. · Divide of users of Internet per various groups. Included only those that use Internet for more then 6 hours per day. · People that can find information on the Internet. · Index of digital literacy.
...E-Education development	· Participation of adults in ICT training. · Compliance of curricula with EU standards (Bologna Declaration and ECTS). · Usage of ICT in teaching. · Share of schoolbooks providing additional CD-ROM content. · Number of subjects supported by electronically enhanced learning · Percentage of teachers using the Internet for non-computing teaching on a regular basis
... The usage of ICT in education	· Number of computers per 100 pupils/students in primary / secondary / tertiary levels · Number of networked computers per 100 pupils/students in primary / secondary / tertiary levels · Hours of computer use per pupil per week · Number of computers connected to Internet per 100 pupils/students in primary / secondary / tertiary levels · Number of teachers that use e-mail · Number of students that use e-mail · Number of computers with high speed Internet connections per 100 pupils/students in primary/ secondary / tertiary levels (high speed defined as ADSL, cable, satellite, and fixed-wireless, UMTS) · Index of quality of computer equipment · Number of schools that have multimedia cabinet

Considered relevant for monitoring of...	Indicator
... The usage of ICT in education	· Number of certified computer science teachers · Number of universities connected, number of primary/secondary schools connected · Percentage of libraries offering Internet access to the public · International links of academic network
... ICT specialist education	· Number of Places and graduates in ICT related third level education · Number of ICT specialists produced per year · Number of publications in ICT related subjects by academic staff in international journals or at international conferences · Number of specialized ICT vocational training courses delivered to ICT professionals and number of professional having completed such courses. · Number of technical schools for ICT · Number of registered training centers for ICT
...The development of more effective, transparent, responsive government and public services	· Number of public service available on-line · Level of understanding and usage of on-line public services by citizens and businesses · Index of security of government information infrastructure · Number of government web sites · Number of web sites at regional or local authorities · ICT spending of the government, share of ICT budget in the overall budget of the government · Percentage of public procurement which can be carried out on-line · Number of government employees having received ICT training
...Government as a promoter, legislator and implementer of information society.	· Governmental bodies in charge of ICT policy and related issues · Number of laws and regulations drafted and approved that are directly related to the information society, compared to European Union legislation
...Informatization of health care services	· Number of public health or social services organizations equipped with information systems, and connected to the Internet · Percentage of health professionals with Internet access · Number of primary cares physicians (PCPs) with Internet access in consulting room or office · Number of PCPs using the Internet to communicate with pharmacies, secondary care (administration, clinical), patients · Number of schools that have multimedia cabinet · Use of different categories of web content by health professionals · Number of professionals in the health and social services sectors having received ICT training
...Development of Locally Relevant Content and Applications	· Number of web sites of museums, libraries, newspapers, journals in local language · Number of local language web portals hosted in the country

Considered relevant for monitoring of...	Indicator
...Infrastructure development.	· Penetration - fixed telephony · Penetration - mobile telephony · Penetration - Internet · Penetration - CaTV · Penetration - computer users · Penetration - TV · Wireless coverage of x% of the country · Internet access costs · Number of independent telecommunications operators · Type and number of services offered · Internet use per economic sector (public sector, academia, private sector, health, social services) · Percentage of households with Internet access · Divide per type of connection (Dial-up, ISDN, DSL, cable, satellite, fixed-wireless, UMTS) · Numbers of secure Internet servers in the country · Number of Public Internet Access Points (PIAP) per 1000 inhabitants
...Development of ICT industry	· Number of SMEs in the ICT sector · Number of companies founded per year producing hardware, software or services in the ICT sector · Number of off-the-shelf software solutions/applications on local language · Number of applications service providers · ICT import divided by total import · ICT export divided by total import · Increase/decrease of ICT import · Increase/decrease of ICT export · Value added in ICT sector divided by value added in total business sector · Employment in ICT sector · Increase of production
...Development of e-business	· Number and proportion of businesses with computers · Employment (level and share) in businesses with computers · Number and proportion of businesses with access to the Internet · Employment (level and share) of businesses with access to the Internet · Number and proportion of businesses with web sites · Number and proportion of businesses with plan to use the Internet · Number and proportion of businesses offering B2C e-commerce · Number of B2C transactions · Types of payment protocols used · Percentage of workforce with (at least) basic IT training · Number of companies that participate in B2B electronic commerce · Number of B2B transactions

3. IN-DEPTH DESCRIPTION OF ICT ENVIRONMENT

3.1. ICT/IS POLICIES AND STRATEGIES

3.1.1. ALBANIA

Support for ICT (and related policies) is connected to the overall situation of the country. Faced with numerous problems related to poverty and economic backwardness, government institutions cannot always take care of ICT concerns properly. In many specific cases, individuals have been able to champion various projects and initiatives. However, an unfortunate downside to this practice is that the project may be abandoned and/or the initiative repeated when that individual leaves the organization.

Deployment of ICT is increasing, but in certain chaotic way. In many cases, lack of financial means is a barrier for introduction of new technologies. Computers are intensely used mainly for the automation of certain work processes (as text processing, spreadsheets and communication), while integrated institutional information systems based on ICT are in their first steps of development.

A National Strategy for Development of ICT was prepared as initiative of foreign/international organizations and accepted by Government in beginning of 2003, but its implementation is lagging back due to lack of necessary attention by Government. At the same time, legislation does not create stimulus for implementation and deployment of ICT, considering both financial and regulation frameworks.

3.1.2. BOSNIA AND HERZEGOVINA

The use of Information and Communication Technology (ICT) by government and the private sector has only recently begun to receive the systematic attention required to turn it into a positive factor in the long-term development of Bosnia and Herzegovina (BiH).

Several factors contribute to the stronger attention given to ICT issues in the post-conflict rehabilitation and development of BiH. First, there is an awareness that e-commerce provides opportunities for growth and that these opportunities must be realized given BiH's current economic situation. Second, there is an understanding of the beneficial role ICT could play in the interaction between businesses, citizens, and governments. This comes as part of the realization that BiH's legislative and judicial systems are ill-equipped at present to take up the challenge of regulation, and that a concerted capacity-building effort will be required to address this issue. Finally, a number of international bodies have also become active in creating standards, model laws, and best practices, notably the United Nations Commission on International Trade Law (UNCITRAL) and the European Union (EU).

Since 2002, several important initiatives raised awareness and lead to situation where BiH Council of Ministers started the process of BiH national ICT Strategy development. The chronology is given in the following paragraphs.

Initiative for Preparation of the BiH Informatization Strategy

In the first half of 2002, the Faculty of Electrical Engineering Sarajevo prepared a key document that was adopted by the Council of Ministers[32] to guide subsequent work on this issue, consisting of two components: the "Initiative for Preparation of the BiH Informatization Strategy" and the "Plan and Guidelines for Preparation of the BiH Informatization Strategy." These papers outline a three-stage process leading to the finalization of an ICT Strategy for BiH that is in essence identical to the process foreseen at present:

- Explore the current situation and chart the route to the large-scale informatization of the society in BiH, in accordance with global trends but taking into account the local situation. (The ICT Strategy should build upon and complement this information.)
- Provide the strategy development framework at the BiH level based on consensus at the level of Council of Ministers and Entity governments.
- Determine ways to implement such strategic decisions. (This shall be the other main element of the ICT Strategy development process besides those described in the present document since the ICT Strategy should also contain action plans and benchmarks for strategy implementation.)

ICT Forum

The ICT Forum was started with support from UNDP to develop situation assessments and preliminary recommendations in a number of areas relevant to the use of ICT in development. The ICT Forum issued a variety of reports in late May 2003, including the BiH eReadiness Assessment Report, which provided a basis from which to proceed in the swift and effective development of the ICT Strategy.

eSEE Agenda

The eSEE Agenda, which BiH signed in October 2002, required signatories to establish a ministerial-level national coordination and policy-making body for IS issues as a precondition for accession to the European Union. This has also been a key recommendation by the BiH ICT Forum. These initiatives are based on the recognition that ICT needs to be an integral part of the long-term development vision for BiH, and BiH has joined a regional effort to build relevant structures and policies.

Memorandum of Understanding

On May 26, 2003[33], the Government of Bosnia and Herzegovina and the UNDP entered into a Memorandum of Understanding on the "Development of BiH Information and Communication Technologies Strategy" (ICT Strategy). The parties undertook, upon signature of the MofU, "to formulate a joint Project Document that will outline the process, expected key results and time-frame" relating to the development of the ICT Strategy. This MOU forms the basis on which UNDP is supporting the development of a comprehensive policy for ICT in BiH, a process that will take place at the expert level with public participation but under the overall guidance of the Council of Ministers

Development of ICT Strategy

The development of BiH's national ICT strategy started in October 2003 as a joint project of Council of Ministers Bosnia and Herzegovina

[32] At the ICT Forum Conference 26-27, May 2003, Sarajevo, UNDP BiH ICT4D

[33] At the ICT Forum Conference 26-27, May 2003, Sarajevo, UNDP BiH ICT4D

and UNDP. The final objective was the full takeover of responsibilities for embracing the information society by the local authorities and transformation of BiH into a genuine Information Society (IS) with all its social and economic implications.

The BiH ICT Strategy Project had two main objectives:

- To articulate a vision - based on extensive consultation processes - to transitioning towards an IS and to outline the policy framework within which the overall and sectoral recommendations will be implemented.
- To outline the Strategy, including Action Plans that will give the recommendations of how this vision can be achieved in each of five key strategic areas of relevance, namely e-Education, e-Governance, ICT Industry, ICT Infrastructure, and e-Legislation.

Present status of that project is as follows:

- Expert group consisting of both government and non-government experts has produced the document "Policy for Development of Information Society in Bosnia and Herzegovina". That document is the framework in accordance with which the future legislation, acts and other regulations will be passed in the process of building and development of information society, and also upon which the future decisions will be taken on the development directions, action plans and priorities at the level of Bosnia and Herzegovina and its entities.
- Starting from Policy document, larger expert groups have developed the strategy documents ("Strategy for Development of Information Society in Bosnia and Herzegovina" and "Action Plan for Development of Information Society in Bosnia and Herzegovina"). Both documents cover five key development pillars identified by Policy document (e-Education, e-Governance, ICT Industry, ICT Infrastructure, and e-Legislation). Strategy document includes the short review of current sector status, defines the vision for the period 2010-2015, and provides set of strategic recommendations for achieving the envisioned status. According to Strategy document, the Action Plan defines set of concrete actions (initiatives, large development programs, projects, pilot projects, etc.) that should be implemented during the period 2005-2010, in order to achieve the goals defined by Strategy paper. More then 100 actions were defined.
- All three documents passed the extensive public and expert debates and consultations. Expert panels produced technical and very specific suggestions on both the strategic and the operational aspects of the ICT Strategy. Through this approach, policy and strategy development was more inclusive and participatory.
- On June 22, 2004, all three papers have been accepted by Steering Board consisting of three Prime Ministers and three Ministers of Communications (Council of Ministers and two entity governments), and representatives of international community.
- On July 29, 2004, papers were officially accepted by the Ministry of Transport and Communication as well. It is expected that papers will be accepted by BiH Council of Ministers before the end of 2004.

3.1.3. CROATIA

The ICT/IS Policy and Strategy of Croatia is explicitly and/or implicitly defined by the following strategic documents:

Strategy of Development of the Republic of Croatia -Croatia in the 21st Century

In April 2000, the Government of the Republic of Croatia started a project entitled Strategy of Development of the Republic of Croatia - Croatia in the 21st Century.

Information and Communication Technology in the Development Strategy of the Republic of the Croatia

One of the nineteen programme objectives focuses on the future role of information and communication technology (ICT) in Croatia's development. In June 2000, the Project Council and programme directors with task forces were appointed to work out specific programme objectives.

On its 19th session of 25 January 2002, the Croatian Parliament adopted the paper and recommended its issuance to the Government. The Government reviewed the final draft on 25 May 2002, issued a strategy paper entitled Information and Communication Technology - Croatia in the 21st Century, and defined the responsibilities for the implementation of every strategic recommendation. Government decisions and the text of the paper were published in full in Narodne novine, issue 109/02 (corresponds to the EU Official Journal).

Annual Report and Recommendations on Croatian Competitiveness

The National Competitiveness Council is an advisory body that brings together representatives of business, government, unions, science and education. It was founded in February 2002 by government decision. The initiative to form the council came from private business and the Croatian Employers Association. The Council stimulates dialogue between the private and public sector, raises the level of awareness and knowledge about the importance of competition, develops consensus on major economic issues facing Croatia, analyses the strengths and weaknesses of the Croatian economy, and recommends and monitors policies that will contribute to long-term sustainable improvement in productivity and the competitiveness of Croatia.

EU Membership Application

In February 2003, Croatian Prime minister Ivica Raèan submitted Croatia's application for membership in European Union to the chair of the European Council. The application was handed over along with resolution on Croatia's joining the EU, adopted by Croatian Parliament in December 2002.

After evaluating Croatia's ability to become EU candidate, the Council would make a decision on granting the status and set a date for the start of negotiations. In case of the best scenario come true, the country would join the Union in 2007 or 2008, together with Bulgaria and Romania.

National Programme of the Republic of Croatia for Integration into the European Union (NPIEU)

The National Programme of the Republic of Croatia for Integration into the European Union (NPIEU), as a crucial control mechanism of the Government's activities in the area of European integration, reflects Croatia's readiness to carry out concrete measures in order to reach its priority goals in the process of integration into the European Union.

In December 2002, Croatia launched its first National Programme for Integration into the European Union.

The key event in relations between Croatia and the European Union in 2003 was undoubtedly the application for full membership. By applying for full membership on 21 February 2003, Croatia formally embarked on the EU accession process. Soon after, on 14 April 2003, the General Affairs and External Relations Council decided to implement the procedure laid down in Article 49 of the Treaty on the European Union and called upon the European Commission to submit an opinion (avis) on Croatia's application. The European Commission

prepared a questionnaire (required for the avis) that the President of the European Commission Romano Prodi officially handed to the Croatian Prime Minister Ivica Racan on 10 July 2003. On 2 October, the Croatian Government's answers to the Questionnaire were formally adopted, and on 9 October 2003, the Croatian Prime Minister presented them to the President of the European Commission.

3.1.4. MACEDONIA

In order to encourage the activities towards growing of ICT Sector and creation and development of Information Society and digital economy in Macedonia a number of strategic policy initiatives and documents have come into presence since year 2000. They have demonstrated the fact that building of Information Society has high priority for the country, and that this process is placed on a high position on the national agenda. These initiatives and document are:

- In July 2000, "e-Macedonia for all" initiative has been started by the former Macedonian President Boris Trajkovski. The Presidential Committee established for this purpose consists of experts from different sectors.
- In March 2002, a "VIP 2002" working group has been established that introduced to the Macedonian Government a document with recommendations for faster development of an information society and digital economy in Macedonia - an "e-Declaration 2002 - Recommendations for rapid development of an information society and digital economy in the Republic of Macedonia as a national priority". In July 2002, this declaration was officially accepted by the Parliament and recognized as a national priority. Stressing the necessity for the country to develop an information society, in order to achieve intensive and sustainable growth and to penetrate into the global trends the "e-Declaration" identifies six main areas as need for:
  - ü Synergy between the public sector, private sector, and the scientific and educational institutions for the achievement of general growth and progress
  - ü Creation of an environment in which the IT departments from organizations and companies will become initiators of their development and progress
  - ü Merging the IT technologies with the needs of the country for the introduction of new services for the citizens and businesses (e-Government, e-Business, etc.)
  - ü Introduction of new business trends and improvement of the regulatory framework
  - ü Advancement of the intellectual property rights protection;
  - ü Increase of the number of human resources highly educated and IT specialized;

- The Government of Macedonia has been actively involved in the regional e-initiative (eSEE) under the Stability Pact initiative. The "eSEEurope Agenda for the Development of the Information Society" adopted in October 2002 in Belgrade, has been accepted by the Macedonian Government. By signing this document, the Government has committed to fulfill the issues of the Agenda within the agreed timetable. One of the commitments is to adopt National Information Society Strategy and Action Plan, based on the eSEE Agenda and National Information Society Policies, with clear goals, responsibilities and timelines for implementation by October 30 2003.In December 2002, according to the ratified e-declaration 2002, Recommendations for rapid development of the Information society and digital economy in Republic of Macedonia, adopted by the National Assembly of FYR Macedonia, a Commission for Information Technology (CIT) has been constituted to initialize and coordinate activities for creation of open information society and preparation of the National ICT Strategy. The main benefit of this body is a direct access to highest level of government. The intention is to consolidate the effort that has so far been invested in the development of an Information Society and to increase the speed of implementation for the eSEE Agenda and Declaration of Principles and Plan of Action adopted during the first phase of WSIS (World Summit on the Information Society held in Geneva in December 2003). The commission consists of five members representing the government, Parliament, and business community, and they work as volunteers. Unfortunately, this body has no executive power. Though there are plans to turn the commission into a government or state agency, it is not known how and when it may happen..
- Even though the official National ICT Strategy does not yet exist, still there are concrete initiatives and discussions to officially start the process of preparation of the Strategy. The talks between the major stakeholder of Information Society have been organized by CIT, United Nations Development Programme (UNDP), Foundation Open Society Institute Macedonia (FOSI-M), MASIT (Macedonian Association for Information Technology), US Agency for International Development (USAID), German Technical Cooperation (GTZ), and others.

The last two events organized on the topic related to e-strategy and information society were held in Skopje. The first one was "e-Government' organized by CIT in November 2003 with the presence of the donor community, MASIT, universities and representatives from the civil society. The second one held in Skopje, in March 2004, in organization by CIT and USAID and with participation of representatives from ICT departments from all governmental institutions.

3.1.5. MOLDOVA

There are several laws that provide a legislative framework for IS development in the Republic of Moldova, among which we should call the Law on Access to Information, the Law on Informatics, the Law on Informatization and on Public Information Resources, etc. Laws yet to be adopted are: On Electronic Document and Digital Signature, and On Protection of Personal Data. Under discussion are a series of other laws and regulations meant to facilitate IS implementation, the fact that demonstrates that both the decision-makers and the civil society have become aware of importance and timeliness of moving in this direction.

In the middle of 2003, the Government through its Department of Information Technologies, with the UNDP support, launched the project "Information Society Technologies for Development". This Project initiated the drafting process of the National Information Society Technologies Strategy. Implementation of this Strategy will generate long-term effects for amplification and extension of e-governance practice, integration in European processes and structures, poverty reduction, improvement of productivity and quality of goods.

The first stage "Drafting Methodology Framework for Evaluation of the eReadiness Level" is closed. According to the ToR proposed at this stage, analytical and synthetic surveys were launched to evaluate the current situation, establish the starting point and Moldova's place in the regional and global context. Results of these surveys will serve as a first step in drafting the National Strategy and Action Plan. Analysis of the situation in this field will lead to formulation of ways to overcome the existing digital divide between Moldova and developed countries,

differences between regions of the country, to establish major objectives to proceed to relevant investment policies.

Identification of the electronic development level is based on determination of indicators values proposed in the report "Methodology Framework to Evaluate the Level of eReadiness" (http://www.e-moldova.md/metodologia.doc), which can help to survey the IST infrastructure, business and everyday use, education and health, e-governance, etc. The following activities are under way now, which will allow analysis of the situation, identification of general and specific objectives, priorities and directions of actions:

- Collection of existing statistical data
- Household and On-Job Surveys
- Surveys among Internet Users
- Survey of Web Presence
- Surveys in Education
- Analytical Case Studies
- Policy Studies

Results of these studies will make a starting point for the IS Building National Strategy that in its turn will lay the basis for an Action Plan aimed to realize the objectives of the Strategy. Termination of drafting works of the Strategy and the Plan is scheduled for the late 2004. Additional information about the pace of the project can be found at http://www.e-moldova.md.

On March 19, current year, the President of Moldova issued a Decree that declared the IS as a national priority. Through this Decree the President obliged the Government to draft and to adopt the National IS Policy, as the IS Building Strategy will be drafted and implemented based on this policy.

A conclusion can be stated: the political elite is conscious that after Moldova has declared clearly its external pro-European message in Brussels and Yalta, chances of its coming closer to the EU increasingly depend on its internal policy rather than its external policy. The message "we want in the EU" must transform into "we realized the following political and economic reforms to come closer to the EU". In this sense activities connected with IS building are timely, also since Moldova signed eSEEurope Agenda.

3.1.6. SCG - KOSOVO

In Kosovo, ICT policymaking and strategic planning are at their initial points, whereas the legal framework, the infrastructure and ICT favorable education system are not well consolidated. Kosovo has and continues to undertake massive reforms of its socio-economical structures to bring it closer to European standards. Although it does not come from policy documents, it is clear that the process is still dependant upon involvement of international organizations and agencies expertise and the individual leadership of very few leaders within the Government and the civil society. Creating a consistent, "home-grown" policy and strategy that could guide reform at the operational level is an enormous challenge. (From Policy to Effective Practice through Quality Assurance, Country Report: Kosovo, July 2003)

The first steps in defining the IT Strategy for Kosovo date as of April 2000 and were initiated by the Central Fiscal Authority. These actions went so far as to define the first draft of the IT Strategy for Kosovo and to establish the IT Working Group. The strategy paper presented in April 2000 provides a respectable overview of the ICT sector, but unfortunately, there is no evidence on further steps undertaken by this group.

The second attempt on this area, the "e-Country Report", bears the date of June 2002 and was prepared by the Ministry of Public Services. The report concentrates on the ICT infrastructure inventory analysis, but does not provide major input on the ICT policy sector.

The most recent steps in developing capacity to define the needs and assess the performance in ICT in Kosovo were undertaken by UNDP and SOROS Foundation (KFOS) in December 2003. The purpose of a project named "Strategic Planning Workshop; Defining ICT Strategy for the Ministry of Transport and Communications for 2005 - 2012" was to initiate and support the process which will develop the relevant and practical documents, methods and procedures of the country ICT Strategy by engaging participants from the government, business, NGOs and academia.

Following the workshop, expert groups were established to work on the preparation of the final draft. There is no dedicated cabinet level body for the development of Information Society.

Within Statistical Office of Kosovo (SOK), there is a Social Statistics Department to perform, among others, Education/R&D and IT statistics. The SOK will increase its cooperation with EUROSTAT through implementation of their methodology and standards in order to build up a compatible statistical system with EU countries.

3.1.7. SCG - MONTENEGRO

Recognizing the importance of ICT as a generator for economic development (as well as for the overall development of its society), the government of Montenegro has defined its Strategy for an Information Society. The Republic Secretariat for Development is the governmental agency in charge of the development of information systems for the state institutions within the Republic of Montenegro. That agency has prepared formal draft material and has developed the methodology for work on the project. The aim of this document is to produce the essential postulates necessary for Montenegro to be on its way toward becoming an Information Society.

A team of experts was included in preparation of the Strategy. Draft of National Strategy has been adopted by Government of Montenegro at the session held on 17 June 2004. The draft document/project was divided into separate subsections (subprojects):

- Introduction section (start point, objectives, recommendation, experiences of other countries)
- Telecommunication infrastructure development
- Education and ICT
- Information systems of governmental agencies and local self-management units
- Health care information systems
- Implementation of Strategy for ICT in Economy, Banking and Trade
- Normative activities
- Strategy for development of ICT sector in Montenegro

For each subproject, a coordinator was tasked with assembling an appropriate team of experts. Further, every subproject required a unique methodology. The prepared draft of the strategy was placed on the web site of Republic Secretariat for Development (www.rsr.cg.yu) for public comment. The hope is that making it publicly accessible would elicit comments leading toward its improvement.

In the process of making this document, numerous sources and recommendations were used. These include:

- Summit of EU leaders, Lisabon 2002;
- EEurope 2005: An information society for all, Brussels, 2002
- EEurope 2003: A co-operative effort to implement the Information Society in Europe Action Plan prepared by the Candidate Countries with the assistance of the European Commission, June, 2001
- Project "Vision", Study of development of Information System of governmental agencies, Republic Secretariat for Development, Podgorica 1996

The prevalent attitude is that this document may be ambitious for the present ICT situation in Montenegro. However, after the Ministerial Joint Statement was signed in June 2002 (for the purpose of putting Montenegro on the path to Information Society and to Europe), it is necessary for Montenegro to work in accordance with its commitments, including those commitments it took on by signing the eSEE Agenda in October 2002.

The draft of the strategy has been prepared with respect to the period 2004-2007. In accordance, a formal action plan has been developed. The action plan includes specific items for every year, and it contains elaborate details for 2004. Activities are projected in accordance with the budget for each planned phase and synchronized with various conferences to be held. The program for the development of e-Governance is divided into small projects in accordance with the EU recommendations.

The action plan cannot be realized with only the allocated funds from the central government. It is necessary to obtain resources from the budget of local governmental units as well as from donations.

3.1.8. SCG - SERBIA

The history of strategic approach to development of information and communication technologies in Serbia began in mid-nineties. That is, in 1996, the Republic of Serbia endorsed the Law on Information Systems. This Law was the foundation for creation of annual Program of information system development in order to define ministries in charge for this task and available resources. Modern Strategy for Further Development of Informatics in Federal Republic of Yugoslavia was created in 1997. These documents initiated development of basic information systems in government ministries and bodies and support new legislative on republican and federal level.

At the beginning of 21st century, the issue of ICT development at national level had to be put in regional and international context with the acceptance of international standards and norms. SCG became active in Stability Pact eSEEurope Initiative devoted to Information Society development in the whole SEE region. In 2002, SCG signed and accepted international agreement "eSEEurope Agenda for the Development of the Information Society" (eSEE Agenda) as a basic document for IT development activities in the SEE region.

By signing that document, SCG agreed that national ICT strategy had to be developed and adopted. New National Strategy for IS Development has to include action items and timetable for the development of an Information Society, which are in line with the actions and the roadmap defined in eSEE Agenda, representing in this way part of regional process and thus placing the Serbia firmly on the path of EU integration.

Concerning the obligations that Serbia undertook by signing the eSEE Agenda, the situation is the following:

- Adoption of National Strategies for IS Development on the basis of the common guidelines prepared by the eSEE WG
  - ü Policy has been completed and published for comment.
  - ü Strategy is being developed based on common guidelines draft.
  - ü Its finalization awaits adoption of the policy.
  - ü Introduction, continuing and finalizing of those activities are expecting from the new Government (conversation is initiated through the new Ministry of Science and Ecology, which is in charge of IS development on national level).
- Cabinet Level Bodies for the development of IS on the basis of the unified model ToR prepared by the eSEE WG
  - ü Separate cabinet-level body (ITIA) was established in February 2001. Additional powers were granted in May 2002 and April 2003.
  - ü In April 2003, ITIA has separated from the Ministry of Science, Technology and Development. It has become a separate Republic institution directly responsible to the Government.
  - ü New director of ITIA has named in the end of 2003.
  - ü Mandate of ITIA is unchanged (regarding to the new Ministries Law, March 2004) and it includes: development, improvement and implementation of e-Government and e-Administration, implementation and use of Internet in e-Government and e-Administration, data protection, ICT standards development and implementation.
- Benchmarking Procedures
  - ü State Statistical body has been working with Eurostat for over a year to increase its capacity for benchmarking.
- Promotion of Information Society for Development-
  - ü ICT Forum was formed in October 2001. Special daily news service was established in the national news agency to promote ICT issues in December 2002.
  - ü In cooperation with National Information Agency (TANJUG), ITIA has started publishing of ICT Bulletin, a weekly publication of ICT news. It has delivering to about 200 addresses of Ministries, Government Institutions, Public Service Institutions, Public Enterprises, Media, etc.
- Establishment of Regional Cooperation and National Implementation Mechanisms Establishment of Regional Cooperation and National Implementation Mechanisms
  - ü Separate cabinet-level body (ITIA) has been established in February 2001. Additional powers were granted in May 2002 and April 2003. Proposal for the Cabinet Committee for IS has been completed.

3.2. LEGISLATION, POLICY AND REGULATORY ENVIRONMENT

3.2.1. ALBANIA

Albanian legislation is in process of development. Beginning with late nineties, a number of laws and government's decisions have provided a basis for telecommunications and deployment of Internet, while specific laws related to the digital age will need to be prepared in the future.

Law No. 8287 dated 18-2-1998, "On the Regulatory Office of Telecommunications," created the Authority for Regulation of Telecommunications as a public independent organization for licensing of telecommunication activities and realization of different regulations between different operators.

Law No. 8618 dated 14-6-2000, "On Telecommunications," set minimum standards and lays the basis for liberalization of

telecommunications sector in 2003, considering principles of "open network provision", "non-discriminatory prices", and "universal service" and "protection of customers privacy". Considering ISPs, this law requires only that licensees must have sufficient capital and knowledge to establish and operate an Internet access point. Non-voice services are fully liberalized.

Application of these principles seems somehow problematic, and Albtelecom was publicly accused by certain media for discrimination with respect to small operators.

Law No. 8506 dated 14-3-2004, "On the Privatization of Strategic Sectors of the Economy," is applied to the Albanian fixed telephony company AlbTelecom S.A. With decision of Government No. 288 of 18-6-1999, the monopoly for urban and long-distance voice telephony was given to the Albanian fixed telephony company Albtelecom S.A. Because the privatization of Albtelecom was not realized in time, a new decision of the government, No. 464 on 3-7-2003, decided to remove the monopoly of voice services in rural areas while postponing the resolution for international voice services until 2005. Mobile telephony is already defined with "limited concurrency." Two operators are active with high penetration of over 30%, and the third license was given for the third operator in beginning of 2004.

Content-related laws have created only a general framework, while major, specific laws directly related to ICT are missing. Existing legislation includes the following.

Law No. 8517 dated 22-7-1999, "On the Protection of Personal Data," guarantees the protection and legitimate use of personal data and their treatment by public authorities. This law defines the conditions under which the public may have access to personal data of an individual, including conditions for the processing of personal data and the security of that data processing.

Law No. 8502 dated 30-6-1999, "Information rights on official documents," regulates the public right of information on official documents.

Other Laws that have impact in deployment of ICT include:

Law no. 8044 dated 7-12-1995, "On competition," defines that no association or operator in a free market can have more than 40% of the market of its activity sector. The law on telecommunications, however, defines that an operator cannot get more than 25% of the telecommunications market, excluding public organizations as Albtelecom SA.

Law no. 7971 dated 26-7-1995, "On public procurement", has been implemented by the Government's approval of two decisions (and the guideline no. 1, dated on 01.01.1996 "On the rules of public procurement"). One drawback of this law is that the law gives priority to the lowest price. Further, the limited number of providers may limit the competition for high quality offers. New rules were applied in 2003 that concentrated tendering procedures of all public sectors to specific ministries. These rules created a big drawback with realization of ICT investments in public sector, and favored big suppliers. The Government also considers implementation of an E-procurement system that will allow for electronic bidding by vendors; however, this Project has been delayed due to the funding constrains on the side of international donors.

Law No. 7564 dated 19-5-1992, "On copyright", concerns every original intellectual work regardless of their form of expression, including computer programs in source or object code and digital data. Reproduction of software can be done without the author's approval if it is indispensable for the use of this program, for citation, for teaching, for libraries and archives, or for legal and administrative purposes. Currently, trademarks are protected by Law No. 7819 dated 27-4-1994, "On Industrial Property".

Law No. 8239 dated 3-9-1997, "On the Press," considers the press as free. However there are some limitations by Criminal Code, as in cases of deliberate insulting or defamation of a person. Courts may also order reveal of information sources if considered necessary. Law No. 8410 30-9-1998, "On Public and Private Radio and Television in the Republic of Albania", puts numerous restrictions on content. It bans all advertising broadcasts which "exercise an influence on the content of programs... that encourage pornography and violence; ...indirect advertisements; ...religious or atheistic advertisements; ...advertisements for political parties or associations, except for the cases provided in the electoral laws;" etc. In July 1999, the National Council of Radio Televisions (NCRT) was established as the entity responsible for issuing licenses and delivery of frequency.

Economic and financial rules for importing ICT include:

- Customs duty for personal computers and other ICT is 5% except cases when they are personal effects, school equipment, humanitarian aid or imported for assembly and re-export.
- Value added tax of 20% is applied for goods and services sold by businesses in Albania which have an annual turnover of more than 8 million Lek (approximately $73,000 in 2003).

Application of these taxes is obligatory when equipment passes through customs, even in cases of donations when VAT must be paid and reimbursed at the end of the year

A positive element is that No VAT applies to the user fees paid for network connection time in Internet cafés.

The Law considers depreciation of ICT systems at rate of 25% per year.

During 2002-2003, the Government of Albania, with assistance of UNDP and Open Society Foundation developed a national ICT strategy, together with an eReadiness report, a road map and a set of indicators. In beginning of 2003 the Strategy was officially was approved by government with Decision No. 216 dated 10-4-2003. In the cabinet of the Minister of State, a sector of ICT policy has been established, to follow the implementation of the national ICT strategy. At the end of 2004, due to government changes, activities of this sector were paralyzed. Currently, there is no high-level focal point for the issues of ICT policy in the Government of Albania, and most of routine tasks and activities related to the eSEE agenda are implemented by the Ministry of Transport and Telecommunications.

3.2.2. BOSNIA AND HERZEGOVINA

The BiH regulatory environment for ICT is weak even in comparison with neighboring countries, whose own ICT strategies are not particularly advanced. This reflects BiH's difficult economic and political situation, which in turn is affected by its unique institutional structure; at the same time, it also highlights the enormous potential ICT presents for economic development.

In terms of legislation and regulatory environment, the major problem in BiH is that a relatively small space, geographically and economically, contains too many legislation levels. Beside BiH itself (as

a state), there are 2 entities and 10 cantons. It means that there are laws and regulations on all those levels: state, entity and cantonal laws.

One of the major preconditions for any improvement in BiH legislation is a simplification of that system. Bosnia and Herzegovina cannot deal with so many legislation systems on three levels, and the only way of making it simpler is strengthening the state level. That trend is visible in last few years. That is very important for legislation related to Information Society development in BiH since the most of those laws and regulations make sense only if they can be applicable and enforced in BiH state as a whole.

There are additional trends that can raise optimism in terms of e-Legislation development in BiH:

- Key institutions that are important for information society development and legislation enforcement are finally functional: Council of Ministers. Entity governments, The Ministry for Civil Affairs, ministries for internal affairs, ministries of finance, ministries of law, Central Bank BiH, Institute for standards and patents, etc.
- Technology basis for information society development has reached relatively good level and some laws and regulations can be applied now.
- New laws and regulations that are not directly related to electronic business or communications respect changes introduced by usage of ICT.
- All new laws and regulations are adopted according to EU directives and recommendations, which respect ICT concerns.

Important government and regulatory bodies are:

- The Ministry of Transport and Communications, Council of Ministers, is one of the key institutions that plays important role in ICT related development.
- The Law on Council of Ministers introduced new and very important institution on state level: Directorate for European Integrations. The mandate of that institution is: coordination of BiH government bodies and preparation of draft policies, laws and other regulations that are related to activities that BiH has to perform in order to be included in process of European integration.
- The telecom sector is under the supervision of the Communications Regulatory Agency (CRA), which issues licenses and monitors service provision. It was established by the Office of the High Representative. It was strictly under international administration until 2003. Today, it is locally governed. Part of the mission of CRA is to promote the development of an Information Society in Bosnia and Herzegovina. It must also encourage the development of a market-orientated and competitive communications sector for the benefit of all citizens of Bosnia and Herzegovina, and protect the interests of all users and operators of telecommunication services in Bosnia and Herzegovina in terms of non-discriminatory access, quality and prices of services. Even though the regulatory role of CRA made significant positive impact it seems that CRA could do much more within its mandate.

However, today BiH does not have governmental body dedicated to information society development (CRA is partly dedicated to that role, but it is regulatory body). The Council of Ministers (CoM) has begun consultations with intentions toward the establishment of an Agency of Information Society. The Agency shall be under the jurisdiction of CoM and is supposed to be the major coordinating body and agent of change in the process of implementing the Strategy for Information Society Development. The draft of Low on Agency of Information Society, by which the Agency shall be established, is expected to be ready for acceptance by CoM and Parliament during July 2004.

Some key laws have already passed the parliamentary procedure and are applicable, although the level of their real implementation is questionable:

- Law on telecommunications, 2000
- Law on free access to information in BiH, 2000
- Law on copyright and similar rights in BiH, 2002
- Law on industrial ownership in BiH, 2002
- Law on electronic business and electronic signature in Republika Srpska, 2002 (applicable in only one entity)
- Law on protection of consumers, 2002

In addition, two important policy papers are adopted:

- Policy of telecommunication sector in BiH, 2001
- Policy for Development of Information Society in BiH, 2004

Both documents explicitly include e-Legislation issues.

The major strategic recommendations for improvement of BiH e-Legislation are given in Strategy for Information Society Development in BiH.

According to that document, new laws that shall be prepared are at least:

- Law on electronic signature
- Law on certification body
- Law on Agency for Information Society
- Law on electronic business
- Law on post-education

There are also additional regulations that shall be prepared:

- Regulation on rules for usage and protection of electronic signature advanced electronic signature, means for electronic and advanced electronic signature production, and the system of certification and obligatory insurance of certification service providers;
- Regulation on technical rules and conditions for connecting the systems of electronic signature certification;
- Regulation on registry of electronic signature certification service providers;

Many existing laws and regulations shall be changed in order to adopt the principles of e-Legislation and aspects of ICT usage:

- Law on higher education
- Law on science and research
- Law on school-books
- Law on technical and special schools
- Regulations related to customs, fiscal policy and public procurement shall be changed in order to encourage the procurement and usage of computer and other electronic equipment;
- Law on state registries
- Law on protection of personal data
- Law on central registries and data exchange
- Criminal Code
- Law on standardization in BiH
- Law on Institute for standards and patents
- Law on protection of consumers in BiH
- Law on obligation relationships
- Law on companies
- Law on trade
- Law on notaries

- Law on banking sector
- Law on insurance system
- Central bank regulations on electronic signature

3.2.3. CROATIA

The focus of the national activities in Croatia is to harmonize legal environment and corresponding institutions to European Union's Legal Framework. Here is the list of harmonized ICT related legal environment by the end of 2003.

3.2.3.1. LEGISLATIVE

Electronic Signature Act

The Electronic Signature Act has been accompanied by the Ordinance on Electronic Signature Certificate Providers Registry (NN 54/02); Ordinance on Qualified Electronic Signature Certificate Providers Registry (NN 54/02); Ordinance on Use and Protection of Electronic Signature and Advanced Electronic Signature, Means for Creating an Electronic Signature, Advanced Electronic Signature and Certification System and Mandatory Insurance of the Qualified Certificate Provider (NN 54/02); and Ordinance on Technical Specifications for Connecting Electronic Signature Certification Systems (NN 89/02), which provide for the registration of unique digital public keys within the national and local governments.

Electronic Commerce Act

The Electronic Commerce Act has been completely harmonized with the Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services in the internal market and with the existing contract law of the Republic of Croatia. However, a law regulating electronic documents, electronic payment and electronic money is still pending enactment.

The Ministry of the Economy has prepared the Electronic Commerce Act, which sets the legal foundation for removing the distinction between safe e-business administration and classical paper administration. This Act will provide a competitive edge to the Croatian economy and public administration and open the way toward a new technological era in which e-commerce will be a prerequisite for competition in the world market.

Telecommunications Act

The Telecommunications Act has defined a new legislative framework for the telecommunications market in Croatia, particularly regulating market relations and customer protection.

The new Telecommunications Act has introduced modern regulations to an open telecommunications market. It has provided for the establishment of the Croatian Telecommunications Agency - an independent national regulatory agency for telecommunications management. It has also provided for a licensing system, interconnection and network access, cable lease, universal services and user protection, tariff policy and cost assessment, addressing and numeration, and the right of passage.

In addition, the Act has defined effective protection of data as well as the means of frequency spectrum planning and management. Despite the provisions stipulating the establishment of the Council of the Croatian Telecommunications Agency, this management body has not yet been formed. New laws related to the information society have been completely harmonized with the EU legislation and protect the interests of the Republic of Croatia using the same mechanisms as those used by the EU to protect its own interests in the international community. All information and communication traffic with the origin and destination in Croatia, as well as the transit traffic is subject to Croatian legislation and the monitoring of information and communication operations is based on the EU principles.

A complete regulation of the telecommunications market requires a series of subordinate laws based on the Telecommunications Act. By now two such ordinances have been enacted, the Ordinance on Addressing, Numerating and Charging in Public Telecommunications (NN 177/03) and the Interconnection and Network Access Plan (NN 185/03). The Radio frequency Spectrum Plan is pending publication in the official journal Narodne novine, and the following regulations are near completion: Ordinance on Telecommunications Services Franchising and Licensing; Ordinance on Telecommunications Services; and the Ordinance on Telecommunications Service Fees, other Fees and Payment.

Electronic Media Act

Electronic Media Act, a new legislative framework for the electronic media market in Croatia (NN 122/03).

Technical laws

A group of technical laws (Standardization Act, Technical Requirements for Products and Conformity Assessment Act [NN 158/03], Accreditation Act [NN 158/03] and Product Safety Act [NN 158/03]) has been completely harmonized with the EU directives, International Organization of Legal Metrology (OIML), international and European standard series EN 45000 and EN ISO/IEC 17000 and international homologation system UN-ECE.

Intellectual property rights

Laws related to the protection of intellectual property rights (Copyright and Related Rights Act [NN 167/03], Patent Act [NN 173/03], Trademark Act [NN 173/03], Industrial Design Act [NN 173/03], Geographical Indications and Designations of Origin of Products and Services Act [NN 173/03], Protection of Topographies of Semiconductor Products Act [NN 173/03]) have been harmonized with the EU directives and international contracts ratified by the Republic of Croatia: The WTO Agreement on Trade- Related Aspects of Intellectual Property Rights (TRIPS Agreement), International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite, World Intellectual Property Organization (WIPO) Copyright Treaty and the WIPO Performances and Phonograms Treaty, European Patent Convention, Cooperation Agreement between the Government of Croatia and the European Patent Organization, Madrid Agreement Concerning the International Registration of Marks and the related Protocol, the Hague Agreement Concerning the International Registration of Industrial Designs and the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration.

Data Protection Act

The Data Protection Act (NN 103/03) defines the protection of personal information and the control over the collection, processing and use of personal information in the Republic of Croatia. The purpose of this law is to protect privacy and other human rights and freedoms from possible infringement through the collection, processing and use of personal data. In the Republic of Croatia, all persons are entitled to the protection of privacy, regardless of their citizenship, residency, race,

sex, language, religion, political and other inclinations, nationality, social background, wealth, birth, social position or other personal traits.

Consumer Protection Act

Consumer Protection Act (NN 96/03): Special emphasis has been done to protection of consumers in the electronic environment.

Right to Information Access Act

The Right to Information Access Act (NN 172/03) regulates the right to access information in the possession and control of public services, defines the principles upon which such access is granted, exceptions to this right, and the means to exercise it and defend it. The purpose of this law is to grant all natural and legal persons access to information controlled by public administration. The work of public administration must be open and transparent in accordance with this and other legal provisions.

Convention on Cyber crime

International relationships in respect to ICT are related to the implementation of the Convention on Cyber crime of the Council of Europe, signed by the Republic of Croatia on 23 November 2001 (NN International Agreement 9/2002). This Convention is necessary to deter actions directed against the confidentiality, integrity and availability of computer systems, networks and computer data, as well as the misuse of such systems, networks and data, by providing for the criminalization of such conduct, the adoption of powers sufficient for effectively combating such criminal offences, by facilitating the detection, investigation and prosecution of such criminal offences at both the domestic and international level, and by providing arrangements for fast and reliable international cooperation.

3.2.3.2. POLICY AND INSTITUTIONAL INFRASTRUCTURE

National ICT policy and implementation is based upon the Section 2.2 strategic documents, harmonized ICT Legal Environment, and the legally defined role of the Government and government and public institutions.

The Government Office for the Internet Infrastructure Development

The Government of the Republic of Croatia by its Decision of 26 July 2001 (NN 70/01) has established the Office for the Internet Infrastructure Development which has been responsible for developing Internet infrastructure, and especially for: providing technical, human, organizational, legal, security and financial resources for a comprehensive introduction of the Internet in everyday work and life; stimulating and coordinating the building of Internet infrastructure; preparing common standards for the introduction of the Internet into public administration and ensuring modern communication between government bodies and citizens; and the promotion of the Internet use as an integral part of culture and education.

The Office has been acting on directions and under the surveillance of the Internet Infrastructure Development Committee, whose members were the vice-prime minister, deputy prime minister, minister of science and technology, minister of European integration, minister of finance, minister of trades, small, and medium-sized enterprises, minister of justice, public administration and local self-government, minister of education and sports, minister of labor and social welfare, minister of the interior, minister of environmental protection and zoning, and minister of health.

The Office has had an expert body, the Council for the Internet Infrastructure Development gathering Internet experts who are appointed by the Internet Infrastructure Development Committee.

By implementation of the Central Government Office for e-Croatia as well as the Croatian e-Envoy, the Government mission and role for accelerated ICT development in Croatia has been improved.

Central State Office for e-Croatia

In order to strength administrative capacity, by the end of 2003 Central State Office for e-Croatia has been formed. The Central State Office continues the mission of its predecessor and strengthens the link to eEurope 2005 strategy and action implementations.

Ministry of Science and Education

The Ministry of Science and Education (former Technology) is responsible for planning, coordination and accelerated development of ICT infrastructure for EU Ambient Intelligence implementations, the interoperability and integration of the information systems for the Information and Knowledge Society in Croatia, and particularly for the implementation of ICT in science and education.

Ministry of Maritime Affairs, Transport, and Communications

The Ministry of Maritime Affairs, Transport, and Communications provide administrative and expert services in telecommunications as the basic national information infrastructure. Communications Department is focused on legal and regulator environment for the new telecommunication market implementations.

Ministry of the Economy

The Ministry of the Economy is responsible for drafting bills and other regulations on the information society that are relevant for the economy, and proposes measures, implements policies, laws and other regulations in that area.

Ministry of Justice, Public Administration and Local Self- Government

The Ministry of Justice, Public Administration and Local Self-Government in cooperation with the Croatian Information and Documentation Referral Agency (HIDRA) drafts new regulations to modernize office administration in the Republic of Croatia and adjust it to the requirements of e-administration and communication in accordance with legal provisions of the EU, on the basis of EUROVOC classification.

Finance Agency

Finance Agency Act (NN 117/01) has established the national Finance Agency (FINA) as the institution that integrates all information and communication infrastructure supporting the systems of state and public finances, registries and information services for public administration, as well as regional and local government.

On 23 September 2003, the Government of the Republic of Croatia and FINA signed a contract whereby FINA assumed the responsibility for the support and development of application services and e-government solutions.

University Computing Centre (SRCE)

University Computing Centre (SRCE) Zagreb is the oldest academic institution whose activities include ICT infrastructure building and application. Its role is to build a stable, reliable, well designed, and advanced information infrastructure that should meet the requirements of the academic community in Croatia, and to provide efficient and readily available help in the use of this infrastructure and ICT.

SRCE encourages co-operation with all participants in information infrastructure building and ICT application in Croatia, especially with the Ministry of Science and Technology and the Croatian Academic and

Research Network (CARNet).

Croatian Academic and Research Network (CARNet)

The Croatian Academic and Research Network (CARNet) is a public institution covering the entire territory of the Republic of Croatia, whose responsibilities have been defined by the Government decision (NN 16/95), as follows: the development, construction and maintenance of advanced information and communication infrastructure servicing the academic and scientific community, including a fast and secure network, a variety of programs and services, connection with international organizations and other academic/scientific networks, and the establishment and maintenance of centralized national Internet services such as CIX (Croatian Internet eXchange) - national Internet exchange service and CARNet CERT (Computer Emergency Response Team) - services related to computer network and system security in Croatia.

CARNet manages the Croatian top-level domain ("hr") and Internet domain registration within the top-level domain in accordance with the powers invested in it by the Internet Assigned Number Authority (IANA) in 1993 and in accordance with the current custom and world trends, and especially with the Top-level Domain Management Plan. Technical management of the Croatian domain is the responsibility of Zagreb University Computing Centre (SRCE) and its HR-DNS service.

Zagreb Municipality EDP Centre

Shared ICT support for Zagreb Municipality and, in conjunction with FINA, to Ministry of finance for the tax and custom administration, and REGOS - National Social Insurance System

3.2.3.3. REGULATORY ENVIRONMENT

Regulators, regulating the new established ICT related rules on the market and society, are implemented in the following areas:

Telecommunication Market

- Croatian Telecommunications Agency, an independent national regulatory agency for telecommunications management.

Consumer Market

- National Agency for the Consumer Protection.
- Agency for the Protection of Market Competition
- Cyber crime Protection Division (within the Ministry of Interior)

Personal Data Protection

- The Agency for the Protection of Personal Data

3.2.4. MACEDONIA

The current regulations in the Republic of Macedonia covering ICT were generally adopted within the frameworks of the following laws: "Telecommunications Law", "Copyright law and other related laws", "Personal Data Protection Law", "Electronic shape and electronic signature data law" and other legal and sub-legal acts which cover this sector. In accordance with the "Telecommunications Law" (Official gazette of RM 33/96; 17/98; and 28/2000 - revised versions) and the annex to the "Personal Data Protection Law" from January 2002, there is sestet of regulations for the access and transfer of sensitive data through Internet. The Electronic Shape and Electronic Signature Data Law that came into effect in May 2001 along with a package of rulebooks regulates this issue, and does so to the degree that little remains for this area to be put in practice. The only thing remaining was to implement the establishment and work of CA (Certificate Authorities). Although some companies, not waiting for the state, have started providing electronic certificates for their clients internally, this area should be wrapped up as soon as possible in order to establish a base for e-commerce, e-government, e-banking and many other areas dependent upon electronic signatures.

With the current Telecommunications Law, the Telecommunications Directorate has been established in November 2000 with regulatory authority in the field of telecommunications. Unfortunately, this body is not independent. It has been constituted under the ministry of Transport and Communications and is financed from the fees charged for utilizing frequencies and supervision (as well as other fees in accordance with its authority. The organizational structure of the Directorate is as follows: Telecommunications department, the department of Radio Communication, the department of Control and Monitoring of Radio Frequencies, the department of Finance, the department of Legal Affairs, and the department of International Cooperation.

In addition, the current Telecommunication Law bans offers of Voice over IP service, as well as the cable Internet service, though one TV cable operator in Skopje in cooperation with two ISPs have started selling Cable Internet packages. Now a new telecommunication law is being drafted and it is believed to be able to correct these issues, and provide better regulation of the competitiveness within the ISP market..

This sphere should also be complemented by the "Law of free access to public information" which was presented in a draft version to the Ministry of justice in July 2003. It is expected to help increasing the amount of information and documents which are available on-line for the citizens and businesses in the country by the governmental and public institutions of the Republic of Macedonia.

The Ministry of Interior is in charge for curbing and dealing with the computer crime in Macedonia, drawing its competences from the Criminal Code of the Republic of Macedonia from 1996, which regulates the issue of illegal penetration into the computer system. Still, since in Macedonia there are almost no online solutions offering transactions on Internet, not many cases of cyber crime are being reported and the reported incidents are mainly lighter variants. The few cases reported and processed so far are mainly related to Internet orders of minor amounts, made by breaking into the data of other people's credit cards. There has been one case where an attempt was made to break into the system of a major bank in Macedonia. Other attempts and completed financial thefts and manipulations have not been registered, as well as some manifestations of computer vandalism as: preparing and putting into circulation some computer viruses. Also, the Ministry of culture and investigators from the State Investigation Office often conduct inspections on previously received tips and bring charges against persons dealing with illegal production, distribution and rental of computer publications, which is contrary to the "Copyright law and other related laws" adopted in September 1996 and the Article 157 of the Criminal Code of the Republic of Macedonia.

Since 1993, Macedonia has been a member of the World Intellectual Property Organization (WPIO), accepting thus all its conventions and agreements.

Since 1997, the Republic of Macedonia has become a member of the Committee of the Paris Union and a member of the Coordination committee of the World Organization of intellectual property.

The Law on Industrial Property Law from 1993 regulates the acquisition and protection of the industrial property rights (patent, model and sample, design trademark, and service mark and

appellation of origin).

The Office for protection of Industrial Property of the Republic of Macedonia administers the administrative procedure and other administrative affairs regarding acquisition and protection of the rights for industrial ownership. Protection of inventions, new shapes, pictures and drawings, trademarks and service marks shall be requested by a submission of an application to the Office.

The Office can also accept application requesting protections of inventions, new shapes, pictures and drawings, trade marks and service marks abroad, if they comply with the international agreements and conventions to which the Republic of Macedonia have been admitted.

Foreign legal person and foreign citizen enjoy the same rights as the domestic legal person regarding protection of industrial property in the Republic of Macedonia if it complies with the international agreements and the conventions or the principle of the reciprocity.

Regarding the process of liberalization of the overall telecommunication sector and the IT sector in Macedonia, the current situation in Macedonia is relatively complicated, especially in the Telecommunication sector. The National Telephone and Internet Operator "Macedonian Telecommunications" (MT) was sold to the Hungarian company MATAV (owned by Deutsche Telecom). The agreement reached for this sale is exclusive (no other operator of fixed telephony can be given permission to operate in Macedonia) to 2005. Together with the previous monopolistic arrangement (in the field of the mobile telephony), the situation continues to be the main obstacle in the last years for the development of telecommunications offers and the drop of prices in this sphere of the country's economy. MT is owned by the same company that was the first operator of the mobile telephony in Macedonia, "Mobimak" (both are owned by MATAV).

Still, in June 2003 the second mobile operator Cosmofon started its work, owned by the Greek grouping OTE.

3.2.5. MOLDOVA

The Information and Communication Technologies (ICT) was always in the center of society's attention, at least it was declared so. Moldova was one of the ex-USSR republics with the highest density of population. If we add here the level of literacy, European culture and traditions, then investments in the ICT and development of human resource were dictated by definition. It is regrettable that it was a long way from declarations to implementation. This was the way the Concepts and Strategies of Informatization have been developed, though most of them have remained nothing but written declarations. The legislative framework in the republic is, from the point of view of readiness for IS development, far from being perfect. It is an unbelievable situation, as no large amount is required to draft and approve the respective legislative documents.

In part, such a situation can be explained by the transition process started in early 90s. Any transition from one system to another is the result of a crisis, which, in its turn, implies other crises (of growth, change, etc.) that overwhelm all social subsystems. In Moldova, the research & development was the most affected one by the transition: production declined drastically, investments ceased faster than production, and expenditures for research fell still faster than investments. However, R&D and the legislative framework form the scientific and practical foundation of the ICT. Unfortunately, in the specific social-economic context of transition, the state did not commit its political will to support the activities associated with performing change by definition, by designing a strategy that had to promote a new management of production and circulation of goods, by urgent setting of an adequate legislative framework.

Specifically, there are the following laws in the Republic of Moldova that make up the legislative framework for IS development:

- The Law on Telecommunications No.520- XIII of July 7, 1995; it establishes main rules and conditions for activities in telecommunications sector in the Republic of Moldova, rights and duties of the government, individuals and legal entities in the process of creation, administration, use, maintenance and sale of telecommunication means, in order to ensure rapid and efficient telecommunication services at reasonable prices to all citizens of the republic, as well as to ensure a free access to public telecommunication services to all potential users, in accordance with available resources;
- The Law of the Republic of Moldova on access to information No.982-XIV of May 11, 2000, which regulates relations between the supplier of information and the individual and/or legal entity in the process of insurance and realization of the constitutional right to access to information, principles, conditions, ways and means of ensuring access to official information in possession of suppliers of information, aspects of accessibility of personal information and its protection in the context of accessibility permission, rights of those who ask for information, including personal information, duties of information providers in the process of securing access to official information, way to defend the right of access to information;
- The Law of the Republic of Moldova on informatics No.1069-XIV of June 22, 2000 that establishes main rules and conditions of activities connected with informatics in Moldova, rights and duties of the government, of legal entities and individuals in the process of creation, administration, use and maintenance of informational systems, principles of and measures to ensure freedom and protection of data in informational systems, right to access to informational services;
- The Law of licensing of certain activities, No. 451-XV of July 30, 2001, determines legal, organizational and economic framework for licensing certain activities, identifies the types of activities subject to licensing, and is aimed to ensure government monitoring of observance of requirements and conditions required to enable respective activities;
- Law No.467-XV of November 21, 2003 on informatization and state informational resources, which stipulates basic rules and conditions for activities connected with creation and development of the national informational infrastructure as an environment for Moldova's informational society, regulates legal relations which can rise during creation, formation and use of state electronic informational resources, of informational technologies, systems and networks.
- Law on the copyright and similar rights No 293-XII from 23.11.1994. Last amended on 19.09.2002.
- Law no. 264-XV from July, 15, 2004, on the Electronic Document and Digital Signature Act, establishes the legal foundations for use of electronic documents and application of digital signature, determines major requirements to electronic document and digital signature, duties of subjects of electronic circulation of documents, as well as methods of government monitoring of use of electronic document and application of digital signature.
- Electronic Commerce Act no 284-XV adopted on 22.07.2004.
- Law no. 284-XV from 22.07.2004, on the Electronic Commerce, on creation of the legal framework for electronic commerce, establishes regulatory principles and those of state support of electronic commerce activity.

Among the regulations issued to provide legislative support to the field can be mentioned the Regulations on services of GSM Cellular Mobile Telephony, Regulations on management of names on the highest domain .md, the Regulations of Settlement of Conflicts between the Operators and between the Operators and Users, elaborated by the National Agency for Regulations in Telecommunications and Informatics (ANRTI), Regulations of Fixed Telephony, Regulations of Interconnection, Regulations of Licensing Activities in the sphere of Telecommunications and Informatics, Preliminary Procedures on Assignment of Numbers, Instructions on the Method of Calculation and Settlement of Charges by Telecommunications and Informatics License holders, Regulations of Tariffs on Telecommunications and Informatics public services, etc.

Before 1990, the responsibility for informatization of the society was assumed by the State Planning Committee. Since 1990 it has become the responsibility of the Ministry of Information, Informatics and Telecommunications, which drafted "The Concept of Informatization of Society", adopted through the Moldovan Government Decision No. 415 of July 5, 1993, and "Draft Guidance for Informatization of Society", adopted through the Government Decision No. 155 of March 6, 1995. Subsequent transformation of the Ministry of Information, Informatics and Telecommunications into the Ministry of Communications in 1994 brought a considerable reduction of the Ministry's competences in ITC sector.

The year 2001 brought about creation of the Department of Information Technologies (DIT) of Moldova, this took over the public responsibilities in the ITC sector from the Ministry of Transport and Communications. Creation of the DIT, and within it a Directorate for IS development, has contributed significantly towards improvement of the situation, though there are still some reservations in this sense.

Another actor on the ICT market is the National Agency for Regulations in Telecommunications and Informatics, which is an independent entity. The strategic option of creating the Agency was to separate regulating from political functions, while the state's role is to give up the operating functions. The Agency is a regulating authority of public utilities in telecommunication and informatics sector, with the status of a legal entity independent of operators and producers in the telecommunication and informatics sector, and independent of the Government, except the cases stipulated in the law. The Agency exercises its regulating authorities to introduce in life the telecommunication and informatics development strategy, to ensure universal service, interoperability and telecommunication and informatics services, protection of users and promotion of loyal competition in the sector.

The ICT industry, with regard to state fiscal policy, is treated as any other sector, in spite of all efforts of civil society and illustrative examples of the neighboring countries. For instance, software development is almost always treated as a service, due to which the VAT is never compensated when it is exported.

There are no exemptions on taxation of persons employed in ICT sector. There are no VAT exemptions or reduction of customs fees on import of computers and other ICT technical resources; moreover, no compensation is available for some individuals or legal entities for procurement of some pieces of equipment (for instance, subsidized PCs for pupils or students from families with low incomes).

No priority is provided to local companies at public acquisitions of hardware or software for administrative necessities. Too restrictive legislative framework does not facilitate entrance to the market for new operators to prevent distortions of competition, and does not ensure high quality of consumer service, does not ensure observance of obligations of the universal service of all participants on the telecommunication market.

The list of licensed activities contains over 20 titles, including project services, installation, construction and mounting of telecommunication networks and hardware, technical services to telecommunication networks, informational services, etc.

In general, the described situation finds its reflection in the results of the survey. The comparison of answers at general closed questions shows the following tendencies:

- There are common similar opinions of the most respondents from all groups for many questions concerning the general situation with ICT development in the country.
- Business sector enough negatively estimates the Government initiatives in ICT domain, NGOs are more optimistic, and Government-respondents are most sure.

This is presented in more details below in the following conclusions.

The level of familiarization about State ICT policy is low. The illustrations for this assertion serve the following survey results:

- The current regulatory framework only modestly stimulates fair and transparent competition for a broad range or operators.
- Business and NGOs are weakly aware of country initiatives to bring connectivity to remote rural area.
- Even those who know about aforesaid initiatives have difficulties projecting the cost for these initiatives to be implemented - within a budget sustainable and affordable for the State and end users.
- Insufficient information exists about any programs to increase awareness in the population of the opportunities that ICT has to offer: Some available to business; some more to NGOs.
- In opinion of the most respondents, there are no efforts made to ensure support, on competitive basis, to socio-economic development initiatives that make use of ICT to service the needs of low-income communities.
- There is no assurance whether or not public institutions will use ICT to make job information available online (to improve performance within the labor market).
- There is no common opinion about the national system of public procurement - does it facilitate supply by competitive micro and small enterprises: only one third of Business respondents think "yes".
- There are no any efforts to develop sustainable e-Government systems to service the needs of the poor and engage their participation in the design and operation of these systems.
- The State isn't implementing an effective system of decentralized decision making to engage the participation of low income and traditionally disenfranchised groups.
- ICT are not being used to give these groups an effective voice. Only Government thinks otherwise.

Several events took place while this report was being drafted (Business forum "Informational Society", April 6 - 7, Conference Bit+ "Informational Technologies 2004", May 3- 7). They stimulated further improvement of the situation. Thus, president of the country declared

the following at opening of the conference Bit+:

"If we want to build a real state, not a virtual one, now it is the time to use what we have - the knowledge and the political will. It is necessary to implement innovational [sic] technologies in all spheres - from the sphere of informational and agro-industrial technologies, to those of management and humanities. What is most important as well is the fact that the policy aimed at stimulation of innovative climate is the matter of Moldova's competitiveness at macro-regional scale, a matter of a special social-economic conjuncture, which has to be built in the country. In the long run, it is the matter of strategic security of the Republic of Moldova. Let us stop boasting of fertile soil and wine cellars. Without decisive reforms and active employment of our intellectual and entrepreneurial resources, Moldova will very quickly turn into a desert at the border of the EU, in which there will be no other population but customs officers, police and tax inspectors."

The president proposed new legislative initiatives, which were sent to the Parliament for examination. These are the Law on Electronic Document and Digital Signature, the Law on e-Commerce, a package of legislative amendments providing exemption from profit tax for businesses in the IT sector, and amendments to the Article 49 of the Tax Code regarding exemption from profit tax for small businesses.

The ANRTI (National Agency for Regulations in Telecommunications and Informatics) has recently made a decision (published on May 11, 2004) on application of provisions of European directives and recommendations for ICT licensing. It has been decided that the number of new operators should not be limited, except such cases when it is necessary to ensure efficient use of radio frequencies or available numbers (should there be any restriction, and for a limited period of time). As well, it has been decided to replace licensing of ICT activities by introducing a system of advisory notes. This will allow the operator who is about to launch a new service just to advise the Agency about the fact.

3.2.6. SCG - KOSOVO

Kosovo, emerging from the war and creating from scratch the legislative, policy and regulatory environment, has not been able yet to fully cover different legal segments that affect ICT sector. Some laws, including Law on Telecommunications, have been adopted and have started to be implemented, while the others like Law on e- Signature and e-Commerce, Law on Cyber-crime, Law on Personal Data Protection are either drafted and in circulation or are planned for the near future. Far from being happy with the mere fact of passing the laws, these laws need to be enforced as well.

Augmentation and enforcement of the legislative framework and ongoing liberalization and privatization have influenced an increasingly positive investment climate such it could be seen during the tendering process for the second mobile operator.

Law on Telecommunications

The Law on Telecommunications was signed by the UN Special Representative of the Secretary General (SRSG) on May 2003, and introduced among others the following division of authorities and responsibilities for the entities:

- The Ministry shall develop policies for the sector, and implement legislation.
- The Telecommunication Regulatory Authority (TRA) will implement the policies of the PISG and Ministry pursuant to the Law on Telecommunications.
- UNMIK will keep the authority to manage publicly owned telecommunications assets, including Management of essential PTK assets through the Kosovo Trust Agency (KTA) in cooperation with the PISG.
- Management of radio frequencies will be carried out by the Frequency Management Office (FMO). Some specific administrative functions will be implemented by the PISG and the respective independent regulatory body.

Major stakeholders and key players

Government

The role of the government in creating the positive environment, liberalization and privatization, and taxation measures that stimulate investment and growth in the ICT sector has been minor. Government efforts have not lead to a visible outcome when it comes to cutting off of the import duties and tax for ICT goods. The reason behind the fact is that the Kosovo government budget is generated mainly from the taxes it imposes on import goods. It lacks any substantial contribution from its industry. (Kosovo's industry is recovering very slowly, if at all, thus leaving no ground for any major financial contribution to be expected from that area. Currently, import of ICT goods is subject to a 10% import tax and a 15% VAT.

The privatization process is controlled by UNMIK through the Kosovo Trust Agency. Government is playing the dominant role in pushing forward the privatization process that had stalled due to the complex property rights disputes and politically driven lawsuits. However, privatization of the main Publicly Owned Enterprises (POE) including the energy provider KEK as well as the PTK is not foreseen in the near future.

Ministry of Transport and Communications (MTC) was established by the UNMIK Regulation NO. 2001/19. Article (vi) defines that MTC has a duty "in the specific sectors of telecommunications, review compliance with European standards covering tariffs and fees, quality of service and technical standards; develop policies to promote competition; and monitor the needs of consumers..." That said, it is the MTC and its departments, in particular the Department of Information Technology and Telecommunications, which are responsible for compliance with EU legal environment regulating the ICT sector.

Ministry of Public Services (MPS) has the potential to play a key role at the operational level. The ministry has at its disposal a large proportion of the budget, while its Department of Information Technology has on a payroll over 80 IT professionals. Being responsible for establishing IT standards and providing IT services for the whole government, the MPS has undertaken respectable efforts in building the optical ring in capital Prishtina and linking all the ministries to it. Additionally, there have been drafted several Acceptable Use Policies, establishing effectively standards in relation to software, hardware, e-mail and staff training.

Ministry of Education Science and Technology (MEST) can play a crucial role in the country's endeavor towards the Information Society. It's "Strategy for Development of Higher Education in Kosovo 2005-2015" (Draft, April 2004), presents a major effort to address the organizational problems and quality of studies in higher education and also tackles the ICT infrastructure, MIS and ICT in general, which presents respectable advancement in this direction.

TRA

The Telecommunications Regulatory Authority (the "TRA") is established as an independent, non-profit body within the Ministry, to

implement the policies of the PISG and the Ministry pursuant to the Law, and all other implementing legislation enacted pursuant to telecommunications.

The TRA will promote and facilitate the provision of sufficient and satisfactory domestic and international telecommunications services, universal services and other services covered in the broadcasting regulations, and most importantly, the TRA is authorized to issue regulations and instruction for the implementation of the present Law.

There are two major concerns that can affect TRA's success; firstly, the frequency allocation authority is still being controlled by UNMIK Frequency Management Office (together with the KFOR Theatre Frequency Management Cell (TFMC)), and secondly, due to a large extent by the lack of interest to support the issue from UNMIK as well as the still weak inner organizational capacity, the TRA has not been able yet to present the case for "...creation of a top - level domain to facilitate the commercial exploitation of the Internet in Kosovo;". (Section 17, 1, d; Law on Telecommunications, Regulation NO 2003/16).

PTK

The Post and Telecommunications Enterprise of Kosovo (PTK) is a public operator of postal and telecommunications services in Kosovo as defined with UNMIK Regulation 1999/12. By this regulation, the PTK was established as a juridical entity and given necessary authority for providing postal and telecommunications services. For the purpose of providing postal and telecommunications services, PTK was given authority to use available public postal and telecommunications assets in Kosovo, including any future expansion. PTK was allowed, with the approval of the SRSG, to establish subsidiary juridical entities to provide specific services. Thus, PTK has now three subsidiaries: Telephony, Mobile Operator Vala900, and ISP Dardanet.

Posts and Telecommunications of Kosovo (PTK) is quite profitable because of its monopolistic position and a concession to Monaco Alcatel to operate a mobile telephone network. Indeed, PTK appears to have been the single source of the sizable accumulation of deposits in the public enterprise sector during 2000-01 (IMF, Kosovo - "Institutions and Policies for Reconstruction and Growth", 2002), (www.imf.org/external/pubs/ft/kosovo/2002/eng/iprg/IPRG.pdf).

However, the company suffers from serious internal accounting problems: its financial operations are not transparent, oversight by UNMIK is weak, and reporting to the fiscal authorities is deficient. (USAID, Corruption in Kosovo: "Observations and Implications for USAID", July 2003), (www.dec.org/pdf_docs/PNACU939.pdf)

PTK has remained under direct control of UNMIK through KTA. The management over PTK was, and continues to be among the sources of major disputes between the PISG and UNMIK.

USAID has given major input through its advisers and experts in developing a sound regulatory framework in the area of telecommunications in Kosovo, which has been established and fully implemented. The comprehensive Law on Telecommunications was promulgated by the SRSG on May 2003. This law is fully compliant with the EU standards. It sanctions establishing of an independent regulator, the Telecommunications Regulatory Authority (TRA) and the premises for liberalization of the telecom market. TRA Board members have been appointed. USAID support to the telecommunications sector in Kosovo expanded in drafting the Law on Electronic Commerce and Digital Signatures,(www.usaid.gov/missions /kosovo/Activities/telecom.htm)

UNMIK is still holding control over the allocation if frequencies through its Frequency Management Office (FMO). This means the TRA will have limited space and authority to "facilitate provision of satisfactory domestic and international telecommunications services" as expected by the Law on Telecommunications. The FMO is expected to fade out in view of the steady hand over of responsibilities from UNMIK to PISG.

3.2.7. SCG - MONTENEGRO

There is no completed legislative, policy and regulatory environment in Montenegro, necessary for legal and proper ICT program in all segments of industry and economy.

In accordance with its eSEE Agenda commitments, Montenegro has to take concrete actions through the introduction of a new legislative framework. It is necessary to bring its legal system into harmony with EU regulations as soon as possible.

Law concerning personal data protection, intellectual property rights protection, cyber crime, electronic commerce, and others need to be brought about to provide a secure and stable business environment attractive for foreign investment.

Law on Telecommunications

The Law on Telecommunications was adopted by Parliament in December 2000 in order to provide a clear regulatory framework for the telecommunications sector of Montenegro.

Despite the fact that this law has been adopted, there is still no document reflecting an appropriate policy for development of telecommunications as an integral portion of a comprehensive ICT Strategy.

In the last three years, Montenegro has realized just a portion of its obligations as determined by law and postulated as necessary for liberalization. In order to bring about the needed legislative and regulatory environment, it is necessary for Montenegro to accede to modifications of and supplements to the existing law.

Law of Electronic Signature

A law of electronic signature was adopted in September 2003. Additional infrastructure is needed to apply this law.

Agency for Telecommunications

Regulatory state mechanisms officiate through the Agency for telecommunications and competent Ministry.

The Agency for telecommunications was established in March 2001 as an independent regulatory agency in accordance with the Law on Telecommunications. The Agency works in accordance with ITU references, too.

Agency is responsible for promoting competition and access to networks, issuing licenses to operators and regulating tariffs in accordance with the Law.

Activities of Agency include the establishment of new market relations through the following set of rules:

- Rules of overall contract terms of interconnection;
- Rules of the way of issue and registry of overall and specific licenses;

- Rules of the conditions of services providing of public telephone booths;
- Rules of amateurs radio communications.

In accordance with these set of rules, Agency issued the special licenses, what was the first steps in establishing of new telecommunications market.

3.2.8. SCG - SERBIA

Serbia does not have completed legislative, policy and regulatory environment necessary for legal and proper ICT application in all segments of industry and economy. Legal system in Serbia must be brought in alignment with the EU regulations. Privacy protection and data handling, intellectual property rights, criminal code, contract law, electronic signature law, electronic commerce law, telecommunications law, and many others need to be enacted to provide a secure and stable business environment attractive to foreign investors. Some modern and well-written laws exist, such as intellectual property protection laws, but these are lacking enforcement mechanisms. Passing laws is not enough - political will, funds and expertise must be secured for their proper enforcement.

The following overview provides more details on the existing regulations and the level of their compliance with the EU legal environment.

Law on Telecommunications

This Law, adopted in April 2003 is partly adjusted to the First European Telecommunications Framework. It introduces the new Regulatory Body/Agency for Telecommunications as well as instruments for fostering competition, but this body is not created yet. However, it establishes Telekom Srbija's monopoly until June 2005.

Implementation of the Law and appropriate legislation is not adopted, but is left for drafting to the mentioned Agency (still not established). Members of the prospective Agency Managing Board will (practically) be appointed by the Government, without the appropriate public consultation process. This does not secure transparency.

Consumer's rights and local loop unbundling are not fully regulated by this Law. This is not in accordance with EU regulations.

Convergent technologies (VOIP) are also not regulated by this Law. This provides favorable conditions to Telecom Serbia for widening the existing monopoly.

This Law prescribes one license per one telecom service provider. This implies that Telecom Srbija will probably be split into at least three companies.

Law on Public Information

This Law is related to the ICT sphere because it specifies the Internet as public media.

Amended Criminal Code

This Law regulates criminal offences against security of computer data. Generally, it covers unauthorized usage of computers and computer networks, computer sabotage, creation and spreading of computer viruses, computer fraud, disruption of electronic data processing and transmission, unauthorized access to a protected computer or computer network, and protection against unauthorized limits to the access of public computer networks.

Criminal code also regulates criminal offences related to software piracy.

Amendments in Criminal Code are in accordance with the basic recommendations of the Council of Europe. However, they are not fully compliant with Council of Europe Convention on Cyber crime. This convention is not ratified by the Parliament of the Union State (Serbia and Montenegro).

(1998 federal) The Law on Copyrights and Related Rights

The comparative law generally accepts that copyright works are protected since the day of their creation. The Yugoslav Law on Copyrights and Related Rights from 1998 does not establish any condition for consideration of copyrights by the Government authorities (for acquiring copyrights). Therefore, neither the number of subjects of legal copyrights, nor the number of subjects on the protection of related rights is known (the right of interpreters, manufacturer of phonograms, manufacturer of videograms, manufacturer of the programs and manufacturer of databases). Property rights of music pieces are handled by SOKOJ (the association of the Yugoslav composers). This is the organization for the collective execution of rights of music authors (UN/ECE, pg. 40)

This law hardly applies in Serbia and is not functional at national scale. Court and judges are not educated and prepared for Internet age, and the Copyright Law itself is not designed for this national transition period.

In this moment, Microsoft (and BSA) claims successful legalization campaign, but this is sole example (Microsoft is recognized as important partner by Gov.).

(1998 Federal) Law on Protection of Personal Data

This law stems from the former constitution (Constitutional Charter) and regulates the privacy of personal data in automated data processing. It is not fully compliant with the European Directives on data protection (i.e. does not predict the existence of data protection commissioner/ombudsman). However, provisions of this Law have never been fully enforced/applied.

Protection of Intellectual Property

This area is regulated by the Law on the Protection of Intellectual Property and the Criminal Code. Both laws are not fully compliant to the international regulations, but provide basic provisions. This Law covers protection of Software products as well.

Broadcasting Law (UN/ECE, pg. 36)

The Serbian Parliament adopted the new Broadcasting Law in July 2002. The Law predicts establishment of an independent Broadcasting Agency to supervise the broadcast media and the distribution of broadcast licenses. The aim is to realize democratization of the electronic media in line with prevailing European standards. Everybody will compete under the same conditions on a public tender in order to obtain broadcast licenses and the right to use specific frequencies. The expectations are the Serbian Broadcast Corporation (Radio-televizija Srbije-RTS) and TRV Novi sad (RTV of the Vojvodina province) to become public services.

Laws related to the Information Society-Those laws are to be adopted by the Parliament.

Law on Electronic Business and Digital Signature

This Law and the four relevant regulations are fully compliant with EU regulations, but they are still waiting to pass necessary assembly procedure. In June 2003, ITIA drafted the Law on Electronic Signature,

which is waiting to be ratified in the Parliament. The Law on e-Commerce and Data Protection is being drafted and should be ready for proposal in the spring 2004.

Law on the Agency for Academic and Research Information (IT) Network

This Law specifies responsibilities of the Agency, which include development and coordination of the Academic and Research IT Network.

Law on Access to Information

The drafted Law is compliant to international standards. There are some reservations regarding Government's capacity to effectively implement the provisions of this Law.

Law on Advertising

This Law regulates spreading of advertisements via traditional media (press, radio, TV), billboards, voice phone and fax. However, it does not provide protection against unsolicited electronic messages (internet, email, SMS, MMS and other multimedia).

3.3. READINESS FOR INFORMATION SOCIETY

3.3.1. ALBANIA

ICT sector is growing significantly in Albania, especially Internet deployment. Situation is rapidly changing from one year to the other, despite the fact that this country has the lowest telecommunication penetration in Europe. There is a general awareness about the role of ICT between people and government; and as consequence, there are many ICT related initiatives, especially private in main urban areas. Mobile telephony has a high penetration in urban areas as an alternative solution in conditions of low penetration of fixed telephony.

Despite this considerable growth of ICT deployment, there are several critical obstacles to be addressed. Some of them are related with cultural and economical conditions, for example the problem of electrical energy shortages, high poverty especially and lack of telecommunications infrastructure in remote areas. In addition, there is lack of data on ICT penetration and usage by different sectors and organizations. As result, it is difficult to understand the real quantitative eReadiness of the country and the impact of many projects that are realized without coordination.

Penetration of ICT, telecommunications and especially of Internet is growing but mainly in major urban areas. Outside these areas, the access is poor, of low quality and of high prices not affordable from population. Liberalization and privatization of telecommunications is expected to have considerable impact in promotion of Internet usage. It is expected that adding a third mobile operator may decrease respective prices, while for fixed telephony services the impact of liberalization is disputable as result of de-facto monopoly of the actual incumbent operator.

An important aspect is lack of formalized information systems and data processing methodologies in management, which creates difficulties for SMEs in preparation of business planning and management. Another important factor is limited number of trained technical people both in ICT and accounting/auditing services. As result, the web presence of companies is either missing or of low quality. Due to infrastructure and electrical energy problems, many content providers prefer using servers outside Albania, and this is another obstacle for business use of Internet within the country.

Public administration, especially in central institutions, intensively uses computers, but this usage is mainly individual, without institutional integration. Institutional applications are missing in the majority of institutions that would make more efficient the work of administration and would pave the way for e-government applications. Almost all ministries, for example, have built institutional web sites but only few of them have dynamic content automatically reflecting their institutional activities (in most cases site updates are done manually).

Education is considered as fundamental for society. However, critical problems related with the infrastructure and educational materials have negative impact on quality of teaching. Poverty of a part of population makes education of children a luxury. Government, aided by different donors, is rebuilding and re-equipping many schools but its impact on real education is questionable. Full curricula for basic elements of computer use are introduced in high schools, but teaching is problematic due to lack of computers and of trained teachers. The academic staff in general (both in teaching and research) works in difficult conditions, somehow demotivated and neglected.

Deployment of ICT applications in Albania is increasing contiguously, following trends characteristic for overall development of the country. There is strong commitment from donors and certain government circles to promote ICT applications, particularly with development and approval of the National Strategy for ICT Development. Problems related with implementation of this strategy are similar with problems the country is facing in all sectors. Their solution depends in willingness for progress of people, especially young generations; as well as the political will of country's leading circles.

3.3.2. BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina has neither systematic way nor dedicated institution to track the status of country's eReadiness. There are only few ad hoc reports that are related to that issue. The most recent research on BiH eReadiness is presented by UNDP eReadiness Report 2003[34]. That report obviously does not address the whole issue of country's eReadiness. However, it is important source of data since it gives the most accurate the most recent status.

That report is not very encouraging. In every area reviewed by that research, BiH ends up showing a deficit, not a comparative advantage. This obviously requires a serious and sustained reaction.

To start with public awareness, it is enough to say only 32.5% of the population have ever used a computer, only 16% have ever used the Internet and only 4.5% have a computer at home. It is clear that poverty, the war, and the failure of the education system generally have all had a role to play in this.

The most disadvantaged groups appear to be rural communities and women. The number of women who have ever used computers is only 85% the number of men. For the Internet the ratio is 73%. Rural communities contain only 43% the number of users of either category that urban ones do.

The groups most likely to have had access are those younger than 25 years of age and the employed. Even here, however, the figures are very low. Only 65% and 45% respectively have used computers, while only 41% and 21% have used the Internet. This can

[34] "eReadiness Assessment Report ", Information and Communications Technologies For Development Conference, UNDP BiH, Sarajevo 2003

hardly be considered encouraging for a country whose future lies mostly in attracting foreign direct investment from, offering services to and competing with the European Union.

With regard to the various sectors investigated, the present situation is similar in all. Variations are of no real importance for general ICT strategy, though they provide some indications of where fine-tuning will be needed.

In every sector, there is a small core of ICT aware and progressive institutions, organizations or businesses investing relatively heavily in ICT and achieving results that separate them clearly from the rest. They are, however, only a very small percentage in any sector and even they are not well developed in comparison with the norm in the rest of Europe. Others are facing serious problems with capacity, hardware, levels of development and understanding on how or why to use ICT.

There are far too few ICT units or even staff and knowledge and motivation in most organizations is at low levels. There is a worldwide shortage of qualified ICT staff. Some countries have special incentive schemes. Others have created special training schemes, with a view to create a workforce that can sell services worldwide. We have done nothing. This is reflected in the poor use of networks, poor levels of access to the Internet, poor use of e-mail and poor exploitation of web pages.

Although a good proportion of employees in most sectors have the educational background that enables them to be creative users of ICT, it is often not the case. This is because the organizations or businesses where they work have in general no strategic vision or understanding of benefits of ICT. Thus, very few have Internet access, and even those who do- do not provide personal e-mail addresses to staff.

The hardware in all sectors is unsatisfactory. Most is old and increasingly obsolete. Although there are some Pentium III and Pentium IV computers, the numbers are very small, and they are concentrated in very few organizations, institutions and businesses. Further, there are indications that investment is on the decline, not increasing.

Use of networks is very poor. This is even more concerning than the status of computer stock, as networks are the basis for computerization of office functions and processes. Without networks, there can be no intranets, no common access to the Internet, and no exploitation of electronic methods of data management, document management or communication. Without networks, computers are all too often just flashy typewriters. This is reflected in the fact that in all sectors the number of printers is almost equal to the number of computers, with only the few large exploiters of networks reporting rational usage.

There is therefore very little exploitation of intranets, e-mail or of the Internet, and the use of web pages to provide services is in its infancy. Nevertheless, a few municipalities and businesses are leading the way.

Office management software is in very restricted use, but there is an encouraging start being made in a few big organizations and businesses in the application of modern methods of document management. What is particularly striking is the poor use of these techniques by professionals, who would normally be a major category of users. The reason is the nearly complete lack of development of the professional sector in BiH.

Distance learning and computer or web based continuous learning should be basic areas of activity. They are crucial if the openness of BiH to the world is to improve and the type of foreign investment hoped for is to be expected. Surveys show very low level of interest in these issues. The lack of legal recognition for degrees of this type is clearly a major factor here.

Investment is non-existent, except in the business sector. It is essentially unplanned too. This indicates the depth of the strategic vacuum.

Finally, the main perceived obstacles are indicative of the strategic vacuum, lack of knowledge and a number of important social problems: the failure of the education system to meet the needs of the information society, the inadequate number of qualified and trained staff, poor financing and outfitting of educational institutions with equipment required for training and outdated curricula.

Raising awareness of the opportunities provided by ICT is also one of the obstacles but also opportunities. Recent field research[35] shows the following facts:

Question: Are there any programs to increase awareness in the population of the opportunities that ICT has to offer?

Group of respondents	Yes	No	Do not know
A. Governmental	43.3 %	40.0 %	16.7 %
B. NGO	34.4 %	59.4 %	6.3 %
C. Education	23.3 %	43.3 %	33.3 %
D. Business	13.0 %	53.6 %	31.9 %
E. International	52.8 %	27.8 %	19.4 %

International organizations are the most aware of programs that promote ICT opportunities (probably because they are the most significant providers in this regard). On the other hand, business does not see it - only 13% of respondent are aware of such programs.

3.3.3. CROATIA

Readiness and evidence of progress of Country's Readiness for Information Society in this report are presented by Country's Readiness Assessment for 2001, estimations being done through Government Office for Internet Infrastructure Development, the estimation of Readiness for the year 2003 (done by Croatia country report author), and comparisons of improvements.

In order to identify the signs and dynamics of ICT developments, as well as provide unbiased assessments, Network Readiness Index Rank for Croatia in the Global Information Technology Report for 2003-2004 is used, along by additional comparative analyses.

The result is showing the main improvements of country's readiness in 2003 developed in information infrastructure, Internet availability and affordability. Improvements are recorded in networked society and networked economy, with a room for additional accelerated developments. Discrete improvements are achieved in networked learning category.

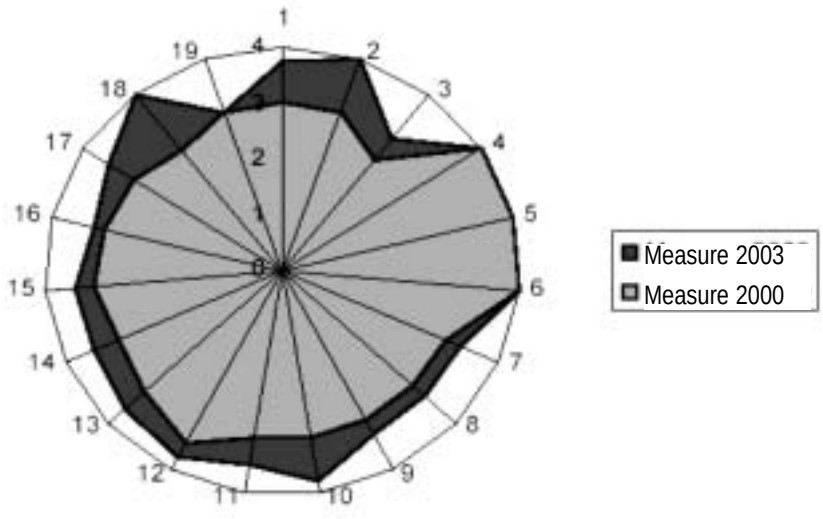
The overall readiness is increased from 3,17 in 2001 to 3,59 in 2003. Analysis of Network Readiness Index Rank for Croatia is presenting Croatia's transiting dynamics to mid cluster position,

[35] Field Research by UNDP and UNV, 2004.

together with the new EU member states (Czech Republic, Latvia, Hungary, Slovak Republic, Lithuania, Poland), targeted to take rank in the higher cluster 3 position (Estonia, Slovenia). The results are presented in the following table.

Croatia: Improvements of Readiness for the Networked World

Category	Description	Criteria	Measure 2000	Measure 2003
Network Access	Information infrastructure	1.1	3	3,75
	Internet availability	1.2	3	4
	Internet affordability	1.3	2,5	3
	Network speed and quality	1.4	4	4
	Hardware and software	1.5	4	4
	Service and support	1.6	4	4
Networked Learning	Schools' access to ICT	2.1	3	3,3
	Enhancing education with ICT	2.2	3	3,3
	Developing the ICT workforce	2.3	3	3,3
Networked Society	People and organizations online	3.1	3	3,8
	Locally relevant content	3.2	3	3,5
	ICT in everyday life	3.3	3,5	3,8
	ICT in workplace	3.4	3,2	3,6
Networked Economy	ICT employment opportunities	4.1	3	3,5
	B2C electronic commerce	4.2	3,2	3,5
	B2B electronic commerce	4.3	3,1	3,3
	E-Government	4.4	3	3,5
Network Policy	Telecommunication regulation	5.1	2,75	4
	ICT trade policy	5.2	3	3
		Average	3,17	3,59



3.3.4. MACEDONIA

According to the "Annual Report of the United Nations Conference for Trade and Development (UNCTAD) for 2003, in regard to the Internet usage the developing countries are experiencing a continuing tendency of faster growth than the developed countries: At the end of the 2002, they were covering 32% of the world 591 million Internet users, in comparison with 28% of the previous year, and it is estimated that until 2008 they will represent 50%. Web is rapidly growing in regard to the active sites whose number has been increased for 17% compared to the previous year. The number of IP addresses using some kind of scripting language (which is, on its part, indication of the increased number of interactivity) has also gone up to 52,1%. In addition, the sites using SSL (Secure Socket Layer) are marked with a growth of 14% and are connected to the business usage of the Internet sites. Internet hosts are mainly concentrated in the developed world: in North America and Europe there are 98% of all the hosts in the world and their number is increasing much faster than in the developing countries.

On the situation in Macedonia, meanwhile, in the ICT field, apart from the influence of the world tendencies, its economic past and strategy are also playing significant roles, as well as the obsolete stile of management and the poor equipment of the companies with IT. In addition to this, the general level of computer literacy of the population in the Republic of Macedonia is very low; the number of PC users in the country is also very low; still, only 6% of the total population use Internet; the number of the highly educated personnel in the field of information science is insufficient.

In Macedonia, there are three times more mobile phone users than Internet users. The initial user investment for a mobile phone is lower than that for the Internet access (if a computer is to be bought) and for a great number of users the sums for the Internet access can be even higher than the mobile phone sums. With the multiple rise in price of the telephone services - from 5 denars[36] per hour for the cheap tariff few years ago to 14.3 denars per hour in the cheap tariff now, most of the money for the Internet access are going for the telephone company. Although it is not the case with all the providers and for every part of the day, some users who decide to save some money paying less for the Internet provider will get such a bad Internet connection that they will spend even more waiting to see something useful.

There is, also, an obvious problem of lack of integration of the state institutions information systems, which are servicing both the public and the private sector. More should be done in regard to the offer of stimulative legislative solutions for development of the Information Society and digital economy. This suggests that, first of all, more extensive analysis should be conducted regarding the situation with the ICT in the country, and also that there is a need to prepare National Strategy of the Republic of Macedonia for development of ICT and action plan for its implementation. In order to achieve this, a real consensus should be involved and reached by all the factors that are important for building Information Society as well as their partnership on the common objective: government, private sector, civil society, science and education, international organizations and media.

The lack of conditions for carrying out e-business transactions because of the unsettled status of the future Certificate Authorities represents a real impediment for the trading through Internet. In addition, without electronic signatures it is not possible to speak about some serious application of e-governance solutions and delivery of e-services for the citizens and businesses.

All of this, together with the issues related to the complete liberalization of the fixed telephony, and the Internet provider services are among the basic issues to influence the process of boosting the penetration of the Internet in Macedonia. In addition, the creation of certain positive environment and tax measures for stimulation of the ICT investments in the companies, can significantly improve the overall image.

For the improvement of the state readiness for Information Society, the improvement of the overall economic situation in the country can also play a major role, and especially finding active and innovative measures for successful coping with the problem of high unemployment rate of a little over 30%.

3.3.5. MOLDOVA

The most substantial impediment in ICT development is the tough economic situation: the country's last place in Europe and only in the second hundred in the world. Deficiency, or often a complete lack of the necessary financial resources, is a dramatic hindrance in development of this field. It explains the extraordinary state of the matters, and solution demands special actions.

The literacy level among the population, though showing a slight drop (from 99% in 1990 to 97% in 2003), remains rather high. The number of specialists with higher education in ICT sector has grown (over 1200 in 2003, even if many left the country), as well as the number of students majoring in ICT, which proves that the society as a whole acknowledges the importance of this sector. Moreover, we have to mention that most of the students have to pay for their studies. Over 1,500 graduates with higher education are expected this year. The number of teachers on ICT faculties in academic institutions has also improved (less than 50% in 2002, over 60% in 2003, compared to the required number). However, there is still much work to do; many teachers have to take two workloads. As to pre-university institutions, the percentage of teachers of Informatics and IT with higher education in the field is still very low (less than 20%). There are schools at which the quality of teaching of informatics is not good or the subject is not taught at all. The survey conducted for purposes of this report showed that almost 66% of respondents believe that the existing school system, especially when it concerns the level of qualification of the teaching staff, is not efficient in teaching the pupils some reliable skills by using ICT and for ICT. Still, the trend is positive, with the number of teachers with higher education in informatics growing slightly but steadily lately.

The survey has also demonstrated the alarming situation in the sector and acknowledgement by the society of importance, urgency and necessity to undertake some rapid actions to improve the situation. The society understands the deficiencies of the regulatory framework and the necessity to introduce such amendments to it that will ensure an honest and transparent competition in ICT operators' activities. Over 50% of the interrogated consider that the honest and transparent competition as it is now is either non-satisfactory or completely lacking. It is true that even the respective authorities are aware of the fact and they do make decisions to change the state of the matters. Only 22% of the respondents consider that the state takes some actions to ensure connection to Internet in the remote rural regions, and only 27% maintain that the cost of such initiative is acceptable both for the state and for the users.

[36] 1 USD = 51.85 MKD

Although there are some programs aiming to promote the ICT (over 36% of the interrogated gave a positive answer), still a greater part of the respondents (over 60%) consider that the state does nothing to meet the need in these technologies among the population with lower incomes. No action is undertaken to develop functional systems of e-Government aimed at the needs of the poor (this is maintained by over 62% of the respondents, other 28% did not answer). Over 62% consider that the decision-making system does not allow participatory approach in resolving administrative problems; almost 70% are convinced that the ICT are not used to offer citizens effective right to opinion.

Situation with technologies is relatively better. It is explained by appearance of private operators, who, in a situation when there is no ideal regulatory legislative framework, still showed initiative and achieved certain success. In these conditions of relative competition, not always honest and transparent, with some public companies often in a privileged situation, the private sector still demonstrated viability and flexibility.

Percentage of length of fibre-optic lines to the total length of interurban telecommunication lines by cable shows a steady growth; enabling a favorable environment for private investments in the sector will further improve the situation. There are fewer and fewer telephone analog main lines; they are being replaced by digital main lines. Theoretically, we can access Internet now from any household equipped with a stationary telephone. Other options appeared, like Internet access via cable television, via mobile telephone, with a number of facilities therewith like making payments via these services.

Allocation for informatization grew over 2.5 times in 2002 compared to 2000. The need in allocations for informatization was acknowledged by the companies, which contribute 94.6% in the sector, while the percentage of budget allocations here is only 5.4%. The number of ICT service providers continues to grow. The estimated number of Internet users is almost 320,000 and the figure continues to grow. The same is true about the number of computers and computer networks, number of sites and informational systems, number of specialists and their level of qualification. As soon as the tax legislation is amended, many producers of software will come out from the shadow economy.

The draft National Strategy on Building Informational Society has been drafted and discussed at various levels (forum, conference, mass-media, decision-makers, etc). Active participation of the civil society, some independent experts not only in ICT, but also in education, science, medicine, culture, business, governance, etc. is a guaranty that both the Strategy and the Action Plan for Building the IS in Moldova will be drafted and adopted before the end of the current year.

In short, both the development trends in the sector, awareness of the civil society and governance of the importance of ICT, as well as the actions towards improvement of the situation that have been already undertaken by both sides, inspire certain optimism.

3.3.6. SCG - KOSOVO

One extraordinary feature of the Kosovo ICT context is the presence and role of the international community in the country. In the post-war period, the United Nations Interim Administration Mission in Kosovo (UNMIK) has made successful efforts in stabilizing the government structures and setting the stage for reforms of the governmental practices by mobilizing the international donor community to support the process. While UNMIK maintains its set of reserved competencies, the majority of the responsibilities have been handed over to newly appointed Provisional Institutions of Self Government of Kosovo (PISG). However, mainly due to the ambiguity in its ability to participate in cross-country relations, Kosovo has stalled in its integration into the region. While exposure to external innovations, technical assistance, and training in the ICT sector is still somewhat limited, there is openness and eagerness for change towards European Integrations in Kosovar society.

The post conflict centralization of the government as initially established by UNMIK and followed by PISG, resulted in decline of the community involvement in governance matters. In general, currently there is very little transparency over the planning processes undertaken by the Government. The Government still tends to elect development strategies including the ICT policy and decide on crucial national issues following, if at all, a very formal consultation process, and in certain cases, this has produced misunderstandings within the ministries themselves. The comprehensive development planning approach is very new for the Kosovo ministries. Traditionally, the sense of ownership in policy affairs is much stronger than that in well-established democracies. Whereas in developed countries the development goals are pertinent to the nation, in Kosovo, currently these are the property of the ministry.

As long as the development of an Information Society is not regarded as a priority by the Government, the digital gap is likely to be a visible presence within the Kosovo society as well as between Kosovo and the region. Necessary actions include promoting, regulating and initiating spending in the ICT sector in general, while focusing specific efforts on education and regional integration. The government also should provide incentives and social schemes for investment in the downside scale of the digital divide.

Main findings are as follows:

- The digital divide in the Kosovo context should be observed from at least two different viewpoints. In addition to the gap between individuals and socio-economic groups within the country itself, due to the ambiguity in its ability to participate in cross-country relations, Kosovo as a whole is suffering extreme regional divide and isolation.

- Kosovo, emerging from the war and creating from scratch the legislative, policy and regulatory environment, has not been able yet to fully cover different legal segments that affect ICT sector. Some laws, including Law on Telecommunications, have been adopted and have started to be implemented, while the others like Law on e-Signature and e-Commerce, Law on Cyber-crime, Law on Personal Data Protection are either drafted and in circulation or are planned for the near future.

- In general, the ICT equipment in educational system in Kosovo consists of small number of fairly newer generation PC computers (PIII and PIV). The usage of ICT in the educational system of Kosovo is increasing daily for both educational and administrative purposes while, at the same time, the lack of connectivity in schools may lessen the chances for serious outputs. There is no Academic and Research Network in place yet.

- Internet access at work and in public places has a potential to prevail on a short run over the access from home which is restricted by factors such as available computer, infrastructure, level of income, training etc. In public places, a breakthrough in computer and Internet access has been achieved through the explosion of the

Internet café business. At an increasing rate, Internet access is also being provided to civil servants in all government structures including the municipality level.

- The actual e-Governance services offered by PISG to citizens and businesses in Kosovo are scarce and incomplete. Little has been done to raise awareness among the public for existence of such services. In Kosovo, the e-Government endeavor undertaken this far has yet to yield serious outcomes. Move toward the Information Society will take long-term commitment and much more coordination of efforts, lead presumably by a higher government level such as Prime Minister's Office or a dedicated, yet to be established, "Information Society" Agency.

- The business environment in Kosovo is regarded better than in many transition economies. However, the e-Business in Kosovo didn't take off yet, due to a complex of correlated factors including ICT Infrastructure, lagging legal framework for e-Business, banking system, lack of foreign investments and lack of tax incentives for local businesses. Nevertheless, computer and Internet usage are progressively being considered as competitive advantages in a tight Kosovo market.

- E-Health in Kosovo is still a long way ahead. The first steps are just being undertaken. The biggest obstacles towards the development of e-health are concentrated around the lack of proper regulative in the field of ICT for health, lack of staff trained in e-Health working in the health sector, lack of funding and also lack of capacity in the Ministry of Health to define and conduct a clear strategy for ICT in health.

- In the ICT industry sector, the Government has not achieved success yet in attracting leading international ICT companies and their development programs. There is no campaign for educating the masses and for enforcing legalizing of the software. Foreign investment in ICT as a priority area is not being clearly encouraged. While select local companies are demonstrating respectable capacity, Kosovo is still behind in recognizing the opportunity and acknowledging the potential of ICT industry.

3.3.7. SCG - MONTENEGRO

The fact is that an undeveloped information and communication infrastructure, an insufficient number of ICT experts, and a climate of ignorance with respect to ICT are the characteristics of the present situation in Montenegro.

About 35% of population doesn't understand the idea of the Internet. The other portion of the population considers the present Internet infrastructure to be underdeveloped, and, from that 65% of the population, majority is interested in opportunities ICT offers.

The Government of Montenegro has shown awareness about the importance of developing an Information Society. Communications and information access are seen as necessary to improving the country's collective outlook. In addition, the Republic of Montenegro has agreed to the eSEE Agenda and therefore has committed itself to the development of an Information Society.

Montenegro has experience in work with the grand complex of data. The information experience of some governmental agencies: Republic Secretariat for Development, Republic Statistics Office, Fund of Pension Insurance, Directorate for Public Revenues, Employment Office and Custom Office can be important postulate for the e-Governance.

Special challenge for development of e-Governance is the reformation of infrastructure of the main registers of data about the citizens, area and business. The efficiency of these solutions is the creator of the success of all programs of e-Governance.

There is awareness of necessarily of bringing connectivity to remote rural areas, but there is no strong initiative.

There are experiences in projecting of information system, hardware engineering and maintenance of systems.

There is no institutional infrastructure for development of ICT as intellectual fund. There is Agency for development of small and medium enterprises, but it is not oriented to ICT.

There is human potential and significant number of experts, but it's hard to keep them in, because Montenegro doesn't give opportunity of specialist education.

Telecommunication infrastructure is more developed in last few years, but there are no suitable conditions of using this infrastructure. It's necessary to make better competitiveness on this field.

In accordance with the leadership and strategic sense, Montenegro doesn't have experience. Lack of ICT leaders is determining factor of its development.

Montenegro defined its administrative system with its Constitution and with laws of state administration and set base for system of data about citizens, area and business.

With the Law of electronic signature was done the first step to e-business, but it's necessary to adopt the set of law solutions to frame law regulation necessary for all aspects of e-Governance.

3.3.8. SCG - SERBIA

The results of this report point very clearly that in Serbia many urgent actions in the field of ICT development are needed in order to enable quicker and efficient economic development and integration in world market of industry, trading and service sectors. Some of them can be listed as follows:

- It is necessary to involve the entire society in the issues concerning Information Society development. There must be constant, public, strong leadership from the very top. Without the top politicians being actively involved in promoting these issues, the lower ranks of government officials will not consider this issue a priority and society at large will not accept it as essential for their future. Public/Private partnership is essential in securing common ownership of the goals. There must be constant and open communication through which problems will be identified and solutions created. The public at large must be made aware of the importance of these issues through constant media coverage. Media should present positive examples and emphasize success. In order to save the time and money, he experiences of other countries in transition should be carefully analyzed and all relevant and applicable solutions should be applied to the situation in Serbia.

- It is necessary to build infrastructure and to de-monopolize and deregulate the telecommunication market. To provide universal and

inexpensive Internet access which is essential for ICT investment, there must be multiple, high-bandwidth choices for businesses and consumers. Government should invest in the alternative fibre-optics backbone to compete with the Telecom monopoly and later privatize it to recoup investment. Appropriate Telecommunications Act should be adopted which is conducive to ICT investment. In order to foster growth and encourage competition, Internet and other value-added services must remain unregulated, with free entry into the market of any number of players. Market will determine value of each provider, rather than the regulatory body. It is also necessary to adopt latest European Union directives on telecommunications in order to avoid redrafting of the law in the near future. Universal right to Internet access and local loop unbundling provisions should be adopted at a minimum.

- Stimulation and support of private sector is very important for Serbia and Montenegro. Administrative procedures have to be changed to foster firm creation. New companies must be able to be formed within a few days and with a minimum of paperwork. Market, rather than high administrative and regulatory entry bar, should decide which companies are capable of providing quality services. It was suggested that domestic ICT companies must be encouraged and supported by both being given a chance to develop local software solutions, and by partnering with large foreign companies in delivering localized versions of existing software and best practices from the world. SCG must have dramatically better commercial conditions than its region in order to attract ICT investment. Corporate tax rates must be eliminated for new investment in ICT for a number of years and be substantially lower than in neighboring countries at all times. Sales tax for ICT products must be eliminated. Accelerated depreciation rate for ICT products must be allowed. Sovereign guarantees must be provided for capital investment in manufacturing plant and distribution centers.
- In order to make Serbia attractive for ICT investment, Serbian legal system must be brought in alignment with the EU regulations. Privacy protection and data handling, intellectual property rights, criminal code, contract law, electronic signature law, electronic commerce law, telecommunications law, and many others need to be enacted to provide a secure and stable business environment attractive to foreign investors. Some modern and well-written laws exist, such as the intellectual property protection law, but these are lacking enforcement mechanisms. Passing laws is not enough - political will, funds and expertise must be secured for their proper enforcement.
- Serbia has to invest in human capital. Permanent education of knowledge workers and production of skilled entry-level workers for the new economy was identified as the most important issue. Economy will need thousands of high-school level workers, proficient in basic ICT skills. Special emphasis must be given to basic training in latest programming languages and standards: Java, ActiveX, Flash, C#, XML, etc. Additional hundreds of thousands of entry-level workers capable of using computers in their everyday jobs will be needed. A standard, internationally recognizable measure of basic computer skills must be established. "European Computer Driving License" certification should be adopted for all graduating high-school students. Programs should be established to ease school to work transition. University level teachers must be provided access to the latest research through conferences, study programs and exchanges with top world universities. On-line, distance training in latest tools and on-line access to modern curricula is inexpensive and effective way to rapidly bring up to date university level trainers. What should be kept in mind is the fact that thousands of workers are unemployed and many more will become so during the process of privatization and restructuring. Social programs should be used to retrain them for the new economy by emphasizing training in ICT skills and reducing the number of retraining programs for the old economy jobs. It is important to create national electronic job market that is skills based.

3.4. ICT INFRASTRUCTURE AND SERVICES

3.4.1. ALBANIA

The main telecommunication operator is Albtelecom S.A. with fixed telephony. In the nineteen-nineties, Albtelecom undertook modernization of its infrastructure and built a national optical fibre backbone connecting some of main cities, as Tirana-Durres, Shkoder-Murriqan (Montenegro), Elbasan-Tushemisht (FYROM), Pogradec-Korce etc. Other segments of national backbone are wireless digital. The main international links are optical (with Durres-Bari, Italy and Corfu-Durres, Croatia) and digital wireless (with FYROM and Greece). Most (99%) of switches are digital. Nevertheless, last mile connectivity and number of switches ports remains problematic, despite the fact that latter capacity is increased 4 times compared with 1997. As result, the number of customers increased from 11,000 in 1992 to 240,000 at the end of 2003. There are about 86,000 requests in waiting lists with a penetration of 7.7% and growth rate of 35% per year.

There are two mobile operators AMC and Vodafone, controlled respectively by Cosmote/Telenor Consortium (85% of AMC for 85.6M$) and Panafon-Vodafon. AMC was the first mobile operator established in 1995, while Vodafone was licensed in 2001 (for 38M$). Despite high prices, due to use of prepaid cards, mobile telephony became popular with over 995,000 customers, which is 32% penetration. Coverage of territory is 80% while of population 90% (taking into account that 2/3 of territory is highly mountainous). Typical core backbone has bandwidth 155 Mbps shared between voice and data transmission.

A third mobile license was accorded to Albtelecom in 2004, with condition that it will create a separate company and follow a non-discriminatory policy with other operators. This new operator, "Eagle", is expected to start operations within one year, and it may have a strong positive impact on price reduction.

Considering rural areas, already there are 25 active private operators with 30,000 customers (there are 48 licensed rural operators). Albtelecom coverage of rural areas is very low at 1%. In addition, Albtelecom obligations are to install at least 30 lines for each commune center until the end of 2004.

Official statistics available for 2000 include:

- Telecommunication Enterprises 14
- Annual average employment 5,635
- Produced value 13,057 MLek (100 M.USD)
- Added value 9,301 MLek (71 M.USD)
- Turnover 13,040 MLek (100 M.USD)
- Investments 4,384 MLek (34 M.USD)

At the end of 2003, only Albtelecom had an income evaluated at 12,500 MLeks (114 M.USD), 2.5 times more compared with 1997 (MTT, 2004).

Data transmission leased lines are offered by Albtelecom, as well as from mobile operators. There is also a private company, a spin-off of American Enterprise Fund, which started to build an optical backbone in Tirana, using mainly underground conduits of Albtelecom and connecting sites of potential clients as banks and big companies. It is expected to extend activities in main cities other than Tirana in 2004-2005

International data ground transmission is still monopoly of Albtelecom, while satellite communication is liberalized, and this created conditions for private ISPs to appear in 1998.

Internet dial-up connectivity was experimented in early nineties, dialing to Italy. But, because lack of financial means and of telecommunication capacities, only in 1996 UNDP started to offer dial-up e-mail service for non-profit organizations; using a satellite international connectivity; and in 1997 Soros Foundation started full Internet access, also for non-profit organizations, using satellite international connectivity and wireless for metropolitan links.

Creation of private commercial IPS-s happened in 1998, the Ministry of Public Economy and Privatization ended the state's telecommunication monopoly, and Parliament passed the law creating the ERT in February 1998.

Private ISPs have based their activities using satellite connections. Local connectivity is dial-up, dedicated xDSL lines and wireless. xDSL lines may be private or leased by Albtelecom. A traditionally used wireless technology is wireless Ethernet applied with directional antennas to reach distances up to several kilometers.

Actually there are 15 active ISPs (more than 20 are licensed) operating mainly in Tirana. Branches of few big ISPs are established in main cities, while dial-up facilities are created for remote areas to access central PoPs. ISPs offer Internet access, email accounts, web page hosting and DNS services for its clients.

There are three ISPs as Local Internet Registry in Albania - Abcom (http://www.abcom-al.com/), Pronet (http://www.pronet.com.al) and Albtelecom (http://atnet.com.al) (Source: RIPE). Other ISPs receive IP numbers from their providers. Other privately allocated IP classes C are of Institute of Informatics and Applied Mathematics (INIMA) (193.254.1.0/24), Faculty of Electrical Engineering (193.254.2.0/24) and Faculty of Natural Sciences (193.254.3.0/24).

Only three ISPs have international connectivity bandwidth of 12 Mbps. Others use bandwidth that varies 256 kbps up to 2 Mbps. Number of subscribers is evaluated up to 18,000, with two biggest ISPs having 80% of all Internet subscribers. About 30% of subscribers use only email. With this number of subscribers, total Internet users may be evaluated up to 100,000 (for 5000 subscribers MTT evaluated 30,000 users). At the same time, penetration of Internet in public and private organizations is evaluated up to 80%. In Tirana there are evaluated to be about 25 Internet cafes in 2002, and 15 in other cities, with a daily usage of 2500 person-hours per day. Number of computers in Albania is approximately 75,000 in 2002, with a growth rate of about 10,000 PCs per year, half of them in business and public sectors.

Albtelecom invested about 500 K$ to build a national Internet Backbone. Internet connectivity is based on its optical links with Italian telecom, but not as a separate Autonomous System. Albtelecom offers free dial-up Internet access, and [when technically possible] from 64kbps up to two Mbps dedicated Internet access for organizations. Technical limitations are an obstacle for Albtelecom to become dominant Internet backbone. Backbone capacities of Albtelecom are already used by eight ISPs, in parallel with satellite links, to increase their international bandwidths.

Home users usually have dial-up access. A number of private and public organizations use dial-up as well, and the rest of organizations use dedicated links. Depending on local network infrastructure, in some of organizations Internet access is given to the staff. Further details for public and academic organizations is given in following sections.

Number of hosts in July 2004 is 588 with 116 duplicates. Number of Internet name zones counted in ccTld .AL zone files is 379, where only 261 are counted as active by RIPE. Average inhabitants per host count are 17,374.

CcTld AL was created in beginning of nineties, and it is kept in Institute of Sciences and Technologies of Information in Pisa, Italy. Administration of cTld is done by ERT. Registrations directly under ccTld are limited to few names:

- Historical names: University of Tirana, Polytechnic University, INIMA, Soros Foundation
- Main government institutions: Presidency, Parliament
- Few international companies and major telecom operators

Financial and connectivity problems made difficult moving of AL root server from Pisa to Tirana. Actually, ERT and INIMA are programming the work to bring home the root server within 2004.

Other registrations may be done under secondary domain names: GOV.AL, EDU.AL, COM.AL, ORG.AL, NET.AL and MIL.AL. All these names are registered at INIMA under administration of ERT.

Number of registered domain names by secondary level domains is:

COM.AL	43%
GOV.AL	23%
ORG.AL	24%
EDU.AL	8%
NET.AL	2%

Majority of domain names used by Albanian subjects are registered under gTlds. There are also 1,505 domain names under different gTld-s used by Albanian subjects, 113th position between 239 countries. Source http://webhosting.info/registries/country_stats/AL]. Of these, 65% domain names have been registered as .com addresses. Financial data about ICT investments and tariffs are as follows.

Average yearly investment in ICT is 2,5-3m USD. Investments in telecommunication infrastructure during nineties have been made, mostly with the support from foreign donors, especially the governments of Italy, Switzerland and Norway plus the EBRD.

Tariffs for fixed telephony were modified at the end of 2003, reducing tariffs of long distance calls and increasing tariffs for local calls. Modification of tariffs was done without matching the reality and

created conflicts and problems between Albtelecom (controlled by government) and communities/organizations of consumers, as consequence tariffs were revised.

Tariffs are different for familiar subscribers, compared with other subscribers. For non-familiars Albtelecom applies tariffs up to 50% higher. Tariffs may vary with the time of day.

With a Lek/USD exchange rate of about 110 in 2003, and without including VAT, normal familiar tariffs are:

- For local calls is
  - 3 Lek for the first two minutes (0.027 USD)
  - 1 Lek for each additional two minutes (0.009 USD)
- For long distance within Albtelecom network of towards rural operators:
  - Within the region: 6.98 Lek/minute (0.063 USD)
  - Between regions: 12.00 Lek/minute (0.109 USD)
- Towards mobile operators:
  42.80-54.50 Lek/minute (0.389-0.495 USD)
- International calls:
  28.60-200 Lek/minute (0.260-1.818 USD)

Tariffs for mobile telephony are high:

- Within the operator's network: 0.9 Lek/second (0.008 USD/sec, 0.491 USD/min)
- Towards other operators: 1.2 Lek/second (0.011 USD/sec, 0.655 USD/min)
- International calls: 1.2 Lek/second (0.011 USD/sec, 0.655 USD/min) plus international charge.

Albtelecom offers ISDN service with following tariffs:

- 128 Kbps set-up fee: 50,000 Lek (455 USD)
- 128 kbps monthly fee: 800 Lek (7.27 USD)
- 2 Mbps set-up fee: 700,000 Lek (6,363 USD)
- 2 Mbps monthly fee: 20,000 Lek (181.82 USD)

Internet tariffs of Albtelecom vary progressively for dedicated access (without including VAT):

- Installation: 500 USD
- For 64 kbps: 400 USD/month
- For 2 Mbps: 6000 USD/month

For public organizations Albtelecom applied reduced tariffs for bandwidth up to 256 kbps, starting with 250 USD/month for 64 kbps. Albtelecom offers only Internet access.

For dialup Internet access through Albtelecom, a tariff of one Lek/minute is applied (0.009 USD).

Tariffs of other ISP-s vary and may be subject of negotiation. Typical tariffs vary depending on duration of contract:

- Email account & browsing max 30 hrs/month 15-20 USD/month
- Email account & unlimited browsing & 5 Mb of web pages space: 35-50 USD/month

Typical web pages hosting prices vary:

- Set-up fee: 50 USD
- From 20 Mb: 35 USD/month
- Up to 50 Mb: 95 USD/month

Tariffs for Internet cafes vary at 100-200 Lek/hour (1-2 USD), which is affordable for majority of potential users.

It is difficult to get public prices for leased lines from main operators, and due to rapid changes of the market, these prices may be negotiable.

Old prices were relatively high. Without VAT, national digital lines prices for 64 kbps - 2 Mbps varied from 2,500 KLek up to 34,000 KLek pr month, with a set-up fee 100-300 KLek (respectively 22.7-309.1 K.USD and 0.91-2.73 K.USD). For international digital lines of two Mbps, they varied from 30,000 USD up to 69,600 USD per month, with a start up fee of 4,000 USD.

Prices of Albtelecom for analog leased lines that may be used with xDSL technology to reach 2Mbps bandwidth have low tariffs of about 5,000 Lek/month (45 USD). The main problem to get analog leased lines is related with capacities of last mile network.

Power system failures represent a critical problem for Albania. Almost all organizations experience frequent power interruptions. There are power voltage oscillations of great amplitude, these are mainly drops (under-voltage) but in some cases, these are surges (over-voltage) --- which can create hardware problems. Only a few organizations have the means to deploy power generators, mainly from private sector. Especially schools suffer from power interruptions.

Power transmission infrastructure does not match well with chaotic urban development and increased demands from population. Power production is based on water resources, which have a seasonal character, and it is not managed in optimal way. Production and distribution have been monopoly of KESH (Corporate of Energetic Service). Prices have experienced recent disputable increases, billing of electricity is not systematic and accurate, and a part of population does not pay bills.

3.4.2. BOSNIA AND HERZEGOVINA

The overall view of BiH ICT infrastructure is positive from some point of view, but negative from some others. The penetration of basic infrastructure (fixed telephony, access to TV and radio) is very high, over 95%.

However, technology level of fixed and mobile telephony, as well as Internet access is not at a satisfactory level. Specifically, the services are not well developed and offered to users. That technological gap between BiH and developed countries has not decreased in the last few years, and it may have increased.

The overview of situation that follows should be treated carefully. Bosnia and Herzegovina still does not have reliable statistics on the state level. Even the number of citizens is a questionable figure, so all the indicators that are calculated "per 100 people" or similar are Suspect and should be treated as estimation.

3.4.2.1. FIXED TELEPHONY

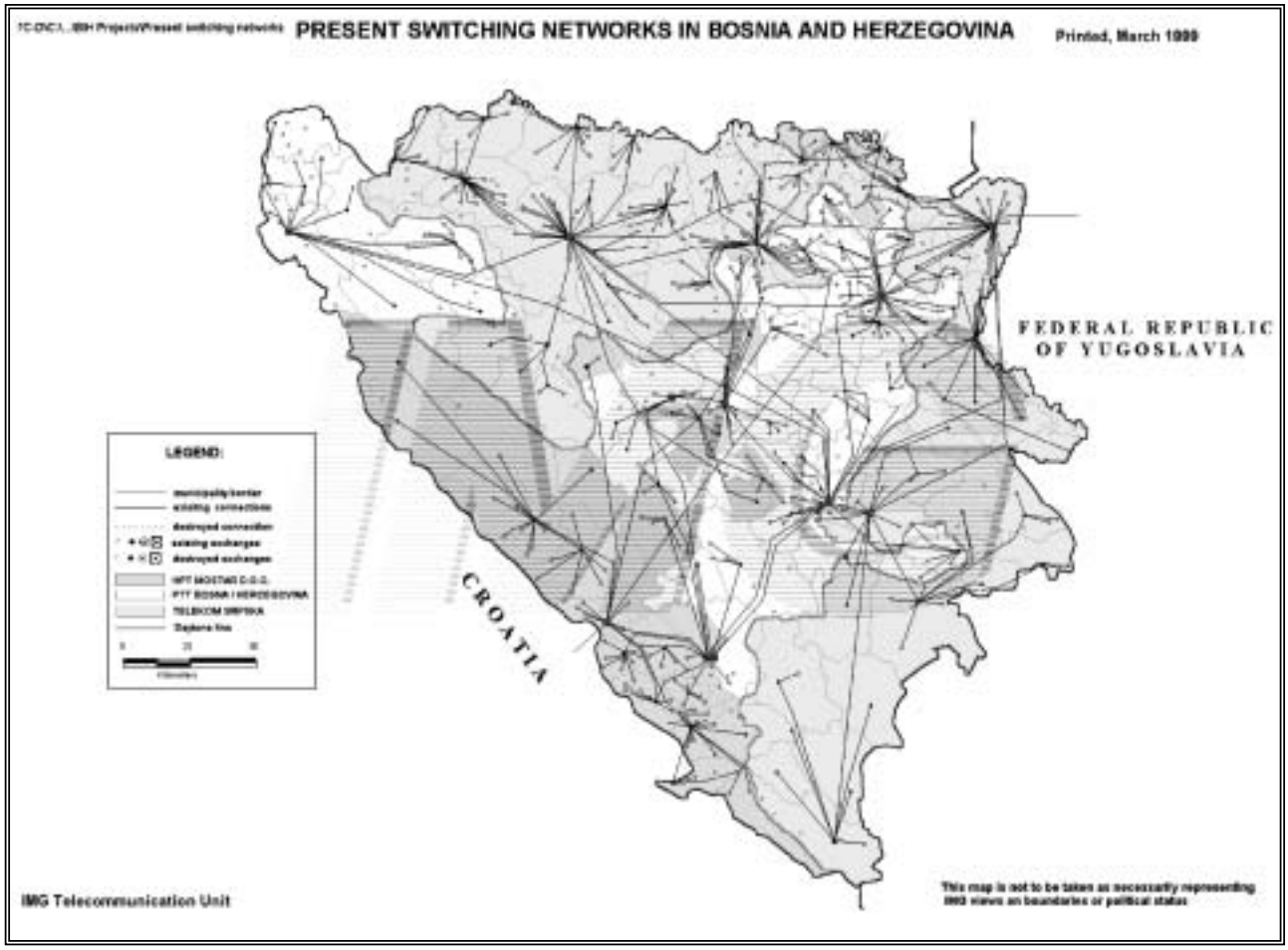
There are three licensed fixed telephony operators in Bosnia and Herzegovina[37]:

BiH Telecom	10% privatized
Telekom Srpske (RS Telekom)	35% privatized
HPT Mostar	25% privatized

Operators almost do not overlap geographically. The BiH Telecom serves the Bosniak majority areas in the Federation of BiH (about 46% of the population) and is based in Sarajevo, RS Telekom, serving the Republika Srpska, based in Banja Luka (about 40% of the population) and HPT Mostar, serving the Croat majority areas of the Federation of BiH, based in Mostar (about 13% of the population).

During and after the war each one of the three operators developed its own transmission network. The networks are mainly realized by use of digital microwave systems and lately as well by optic fibre cables[38].

Present switching network in BiH is presented in the following figure[39]:



37 Official data provided by BiH Communications Regulatory Agency (CRA)

38 International Management Group (IMG) (http://www.img.ba), according to INA Communication Infrastructure Assesment - eSEE Countries, 2003

39 INA Communication Infrastructure Assesment - eSEE Countries, 2003

The UNDP eReadiness Report 2003 shows that BiH telecom is the largest provider of telephone lines (53%), followed by RS telecom (33%) and then HPT (14%), as was to be expected. As we can see, the ratios are relatively stable. They have not changed significantly over the period, so we can assume the similar values for 2003.

Data from UNDP BiH eReadiness Report 2003[40], Year ending at 31.12.

	2000			2001			2002		
	BiH Tel.	RS Tel	HPT	BiH Tel.	RS Tel	HPT	BiH Tel.	RS Tel	HPT
Coverage	%	%	%	%	%	%	%	%	%
Percent of population covered	46.0	40.0	13.0	46.0	40.0	13.0	46.0	40.0	13.0
Share of main telephone lines in operation	52.4	33.6	14.0	53.6	32.2	14.2	53.8	32.0	14.2

The basic indicator for penetration of fixed telephony in BiH is total number of 950,000 connections, which, relatively to estimated number of 3,700,000 citizens, gives penetration of about 25%. However, this percent shall be calculated not relatively to number of connections but to number of households since one connection provides access for whole family. There is no clear information on total number of households in BiH, but it can be estimated that average family in BiH has almost four members. It gives the estimation of more then 95% penetration. Almost all BiH citizens have access to fixed telephony network.

The number of ISDN users at the and of 2002, shows much better penetration in area covered by BiH Telekom then on those covered by other two operators:

Data provided for end of 2002	BiH Tel.	RS Tel	HPT	Total
ISDN subscribers	3888.0	1751.0	323.0	5962.0
% Population covered by operator	0.23	0.12	0.07	0.16

Charges are presented in the following table:

Year ending 31.12.

	2000			2002			2004		
Tarifs	BiH Tel.	RS Tel	HPT	BiH Tel.	RS Tel	HPT	BiH Tel.	RS Tel	HPT
Residential telephone connection charge	297.00	500.00	270.00	297.00	250.00	270.00	297.00	165.00	220.00
Business telephone connection charge	297.00	1000.00	270.00	297.00	250.00	270.00	297.00	165.00	220.00
Residential telephone monthly subscription	3.52	2.73	10.00	3.52	2.73	3.52	3.52	4.95	3.52
Business telephone monthly subscription	22.00	9.99	22.00	22.00	9.99	22.00	22.00	9.99	22.00
1-minute local call (peak rate)	0.0193	0.0080	0.0300	0.0193	0.0080	0.0300	0.0193	0.011	0.0286
1-minute local call (off-peak rate)	0.0097	0.0040	0.0150	0.0097	0.0040	0.0150	0.0097	0.0055	0.0143

Note: All prices are in KM (1 EUR = 1.9556 KM)

[40] UNDP BiH eReadiness Assessment Report 2003

As we can see:

- BiH Telekom did not change the prices for more then 4 years
- HPT did not significantly change prices for 1-minute local call for more then 4 years
- RS Telekom has even increased charges for 1-minute local call
- BiH Telekom has highest connection charge
- RS Telekom had extremely high connection charges in 2000, but today it has the lowest rate
- HPT has very high charges for 1-minute local call

In general, this situation cannot be denoted as "liberal and regulated" market. It seems that operators were not forced to change policy for more then 4 years, and significant differences between prices are obviously the result of the lack of real competition between operators. Actually, three operators in BiH are in monopoly position, since they have clearly divided the BiH territory into their "coverage areas".

3.4.2.2. MOBILE TELEPHONY

There are three licensed mobile (GSM) operators:

- BiH Telekom,
- MOBI'S (RS Telekom), and
- recently HT Mostar

Until recently there was also the non-licensed operator (Eronet) which is still functioning, even though it was not officially licensed at CRA.

It is in a severely troubled and complicated situation mostly cased by war division and corruption, especially in respect to the ownership and status[41]:

ERONET was founded in 1996, as a joint venture of HPT Mostar d.o.o. (the partially stated-owned fixed services operator) holding 51%, and the Hrvatske Telekomunikacije (HT) Zagreb d.d. (the Croatian Telecom) holding 49%. However, in 2000 the then administration of HPT Mostar illegally transferred its control package to three private companies: Hercegovina Osiguranje, Croherc and Alpina Komerc. The first two of them were controlled by Hercegovacka Banka (60% share in the Hercegovina Osiguranje and 100% share in Croherc), which in this way became -indirectly- a 40% shareholder of ERONET. As a result, when the CRA was in the process of issuing licenses in accordance with the Telecommunications Sector Policy, ERONET had no state ownership at all, it was not eligible for a license without a tender and therefore it was not granted one. The transfer of HPT Mostar's controlling package of equity to private hands was claimed as illegal by the Federation Privatization Agency and other involved bodies initiating a long dispute started, involving legal actions and several business maneuvers in an attempt by HPT Mostar to re-acquire its share in ERONET. Up to the present time such re-acquisition has not been achieved[42].

To complicate things further, on the same date that the CRA granted the first two licenses (30 April 2001) it also opened a tender for a third mobile operator license, with a deadline of bid submissions set on 15 June 2001. The bidders were: Hrvatski Telekom (HT) (Croatian Telecom), ERONET (still under private control and therefore obliged to participate in a tender in order to gain a license), Rumeli Telekom, Zepterfone, VIP BiH and VIP BiH[43].

On July 30 2001, two of the bidding companies - Hrvatski Telekom (HT) and Mobilkom Austria, the main company behind VIP BiH- expressed their serious concern over their participation in the above mentioned tender, relating to the politicization of the process and as a consequence, HT formally withdrew its bid. The CRA, taking into account these developments, decided to cancel the tender for the third GSM license.

In late 2002, there was finally a change in the ownership structure of ERONET: Hercegovacka Bank (ERONET's indirect shareholder), concluded a questionable share sale agreement, transferring 4.48% of ERONET's equity to the municipality of Grude, BiH. Becoming partially state-owned, ERONET automatically also became eligible to a license, without a bidding process, subject to the payment of a premium.

The premium that ERONET will have to pay for this license was to be determined by independent consultants, whose final findings will require the agreement of the Council of Ministers. After an open tender for the selection of such a consultant, held on March 2003, PricewaterhouseCoopers from Prague were awarded the contract for the evaluation. In accordance with prior decisions of the Council of Ministers, the first two operators were charged only 2,5 million KM for fee for the issuance of the licenses and therefore, it is not possible for the CRA to charge any third operator a significant on-off fee. The price tag for the license set by PricewaterhouseCoopers consultant was 20 million KM which was dismissed by Council of Ministers as inadequate and the whole process has brought to stand.

Following this dismissal and non-acceptance of the consultant Report by Council of Ministers the CRA decided to set a different criteria for awarding the third GSM license and in June 2004, the license was formally granted to HT Mostar, thus preventing the Eronet for further working as independent GSM operator. However, ERONET is already technically and commercially active, raising the number of service providers to three.

The overall penetration of mobile network is about 31% (1,150,000 users). However, there is much more prepaid then post-paid users. The access is provided on the whole territory of BiH through temporary roaming service between operators.

(41) The situation will be described by quoting "The INA Communication Infrastructure Assesment - eSEE Countries, 2003"

(42) Office of the High Representative in BiH, Press Office, Various Press Releases and News Round-ups, 2000-2003.

(43) Communications Regulatory Agency, Various Press Releases, 2001-2003.

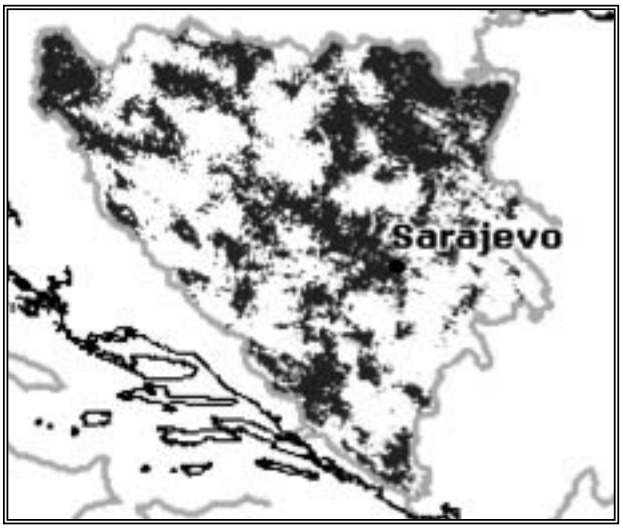
The following table shows basic indicators available at the end of 2001 and 2002:

Year ending 31.12.

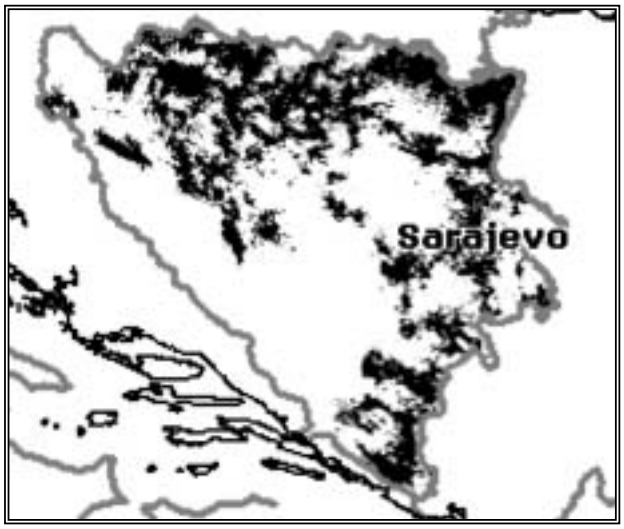
	2001			2002			2003		
Indicator	BiH Tel.	RS Tel	Total	BiH Tel.	RS Tel	Total	BiH Tel.	RS Tel	Total
GSM telephone subscribers	234.000	158.700	392.700	364.000	293.200	657.200	520.000	370.500	890.500
% Pre-paid subscribers	60.0	55.7		32.0	75.9		30	65	
% Post-paid subscribers	40.0	44.3		68.0	24.1		70	35	
GSM subscribers per 100 inhabitants	11.6	11.3	22.9	18.0	20.9	38.9			

The coverage of all three operators is shown on the following figures[44]:

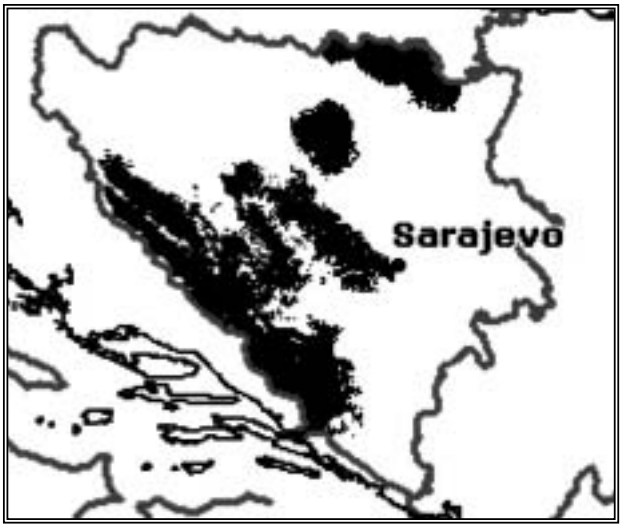
BH Telecom coverage map (March 2003):



MOBI's coverage map (March 2003)



ERONET coverage map (March 2003):



[44] INA Communication Infrastructure Assesment - eSEE Countries, 2003

Charges are presented in the following table:

Year ending 31.12.

	2000			2002			2004		
Indicator	GSMBiH	MOBI'S		GSMBiH	MOBI'S		GSMBiH	MOBI'S	Eronet
Cellular connection charge	99.00	140.00		49.90	60.00		49.90	30.00	45.00
Cellular monthly subscription	20.00	2.73		18.00	2.73		18.00	10.00	27.50
Cellular 1 min. local call charge (peak rate) post-paid	0.50	n/a		0.22	n/a		0.22	0.33	0.33
Cellular 1 min. local call charge (off-peak rate) post-paid	0.39	n/a		0.30	n/a		0.22	0.165	0.22
Cellular 1min./1sec. local call charge (peak rate) pre-paid	0.80	n/a		0.38	n/a		0.30	0.451	0.44
Cellular 1min./1sec. local call charge (off-peak rate) pre-paid	0.60	n/a		0.38	n/a		0.30	0.275	0.33

Note: All prices are in KM (1 EUR = 1.9556 KM)

Note: Mobile operators have many different tariff models, including both post-paid and pre-paid. The table presents standard packets.

Services with added value are not well developed. The following table shows that operators are offering basic services, but no sophisticated services (for example, WAP):

Service	GSM BiH	MOBI'S	Eronet
SMS	Yes	Yes	Yes
GSM Data	Yes	Yes	Yes
Voice Message Service	Yes	Yes	Yes
GPRS	No	Yes	No

3.4.2.3. INTERNET ACCESS

The Internet penetration is estimated to 150,000 users (about 4%). The total number of Internet users (that in addition to regular, includes temporary users) is estimated to 10-12%.

Because of latest fast development of cable TV operators market, the overall Internet penetration is expected to significantly grow in urban areas in next few years (cable TV operators started to offer the infrastructure to ISPs).

There are 41 licensed Internet Service Providers (ISPs) in Bosnia and Herzegovina[45].

Services packages that are offered and prices vary according to area of coverage. In general, it can be said that the Internet access is expensive in Bosnia and Herzegovina.

Personal Access

Standard personal packages and prices are given for a typical provider (the largest provider, BihNet) in the following table (these prices do not vary too much at the other providers):

Service	Charge
Dial-up monthly subscription	5
Dial-up KM/min. (peak rate)	0.0099
Dial-up KM/min. (off peak rate)	Free
Non-limited dial-up access, monthly	59
ADSL connection charge	165
ADSL 512/128, 1 GB limit, monthly	77
ADSL 512/128, 2 GB limit, monthly	110
ADSL 512/128, 5 GB limit, monthly	231
ADSL 512/128, non-limited, monthly	770

[45] Official data provided by BiH Communications Regulatory Agency (CRA)

Business Access

Standard leased line access packages and prices are given for few typical providers:

Service	BihNet	Logosoft Sarajevo	Team Consulting Sarajevo	MAXnet Mostar	HT Net Mostar
Leased Line 128 Kbps, monthly	748.00	658.90	650.00	1,000.00	748.00
Leased Line 256 Kbps, monthly	1,298.00	1,190.20	1,390.00	2,000.00	1,474.00
Leased Line 512 Kbps, monthly	2,442.00	2,238.50	2,602.00	4,000.00	2,860.00
Leased Line 1024 Kbps, monthly	4,620.00	4,235.00	4,823.60	n/a	5,544.00
Leased Line 2 Mbps, monthly	8,800.00	8,066.30	9,422.48	n/a	10,912.00
Leased Line 8 Mbps, monthly	29,040.00	n/a	n/a	n/a	n/a
Leased Line 34 Mbps, monthly	93,500.00	n/a	n/a	n/a	n/a

Most of the providers offer various Internet related services:

- Other type of access (dial-up, ISDN, wireless, or cable);
- Web hosting
- E-mail server(s)
- Audio/video streaming
- Web design
- Etc.

3.4.3. CROATIA

3.4.3.1. ICT - STATISTICAL DATA

	2000	2001	2002	2003
ICT infrastructure and access				
Telephone mainlines (per 1,000 people)				422
Mobile phones (per 1,000 people)				563
ISDN lines (per 1,000)				62
ADSL services (per 1,000 people)				0,53
Computers and the Internet				
Personal computers (per 1,000 people)	112	136	169	208
Internet users (per 1,000 people)			178	211

3.4.3.2. ICT INFRASTRUCTURE

Telecommunications

Croatia is at a relative advantage with respect to its neighbors as regards the existing physical infrastructure to support high-speed networking (100% fibre optic backbone network in Croatia).

Fully 100% of the switches deployed on HT's backbone are digital. HT is connected to DT's extensive European backbone network. This connectivity, coupled with connections to Austria, Italy, Hungary, Slovenia, and the U.S., gives Croatia international connectivity to 35 countries.

As of the beginning of 2005, HT-Hrvatske telekomunikacije d.d. will be obliged to provide access to its unbundled local loop, as well as the services of number portability and pre-selection of operators.

Basic optical infrastructure

The basic optical infrastructure (backbone) of the Republic of Croatia is the ownership of the national telecommunications operator HT-Hrvatske telekomunikacije d.d, and it includes more than 14,000 km of underground cables laid in plastic tubes with the total average of installed capacity of app. 300 000 km of optic cables. The backbone infrastructure is well built in the whole of territory of the Republic of Croatia.

For "alternative" infrastructure, the project for utilization of optical infrastructure near the roads, railways, electrical lines, owned by several companies (Hrvatske autoceste/Croatian Highways, HEP-Hrvatska elektroprivreda/Croatian Electric Company, JANAF/Adriatic Oil Pipeline, H -Hrvatske eljeznice/Croatian Railways) is currently in the initial phase.

Use of cable television for telecommunications

There are 25 concessions allocated for cable television until August 2003, and two of them are on the state level. The cable television sector is completely liberalized. Cable distribution service providers may provide other telecommunications services (Internet, telephony etc.) based on the license obtained from the Agency.

Satellite radio communications

INTELSAT, INMARSAT, EUTELSAT etc. as well as new Business Entities and competition are emerging in the national telecom market.

Operators

- Public voice telephony (PSTN, alternative infrastructures, e.g. utilities). Concession holder for telecommunication services in the fixed telephony in the Republic of Croatia is HT - Hrvatske telekomunikacije d.d.

- Public land mobile communications (analog and digital non-GSM, GSM, DCS 1800, UMTS, paging). Concessions for providing mobile telecommunication services in the Republic of Croatia belong to:
  - ü HT mobilne komunikacije d.o.o. (HT mobile) which comprise two networks of mobile telephony: analogue mobile network NMT 450i (brand HT mobitel), digital mobile GSM 900 network.
  - ü VIPnet d.o.o. - has concession for digital mobile GSM 900 network. The publication of a public tender for concessions DCS 1800 and UMTS is soon expected.

- Private land mobile telecommunications (e.g. taxies, transport, emergency services) There are two PMR trunking networks and several smaller TETRA networks (Hrvatska elektroprivreda/ Croatian Electric Company, police, emergency medical help).
- Satellite communication. Odašiljaci i veze d.o.o. have two BSS land stations for connections with EBU and for broadcasting the Croatian program via satellites HB-3 and HB-5. There are more than one VSAT networks. There are several INMARSAT maritime and land mobile terminals.
- Data communication. Hrvatske telekomunikacije d.d. (VPN data) offer the users private networks for data transfer based on MPLS (Multi-protocol Label Switching) technology, which encompasses the best features of classical private networks (privacy and quality of service), and of IP protocols (flexibility and stability).

  Hrvatska elektroprivreda/ Croatian Electric Company, Hrvatske eljeznice/Croatian Railways, and Hrvatske vode/Croatian Waters have networks for data communication.

- Cable television. By August 2003, 25 concessions for cable television were allocated, out of which two concessionaires have concessions on the national level, and 23 of them on local level.

  Significant contribution to acceleration in Gigabit CARNet implementation (dark fibre).

Liberalization plan of the telecommunications market

The telecommunications market opened for new operators and service providers in the fixed network after the expiration of HT (Domestic FT operator Croatian Telecommunications) rights on 1 January 2003.

Deutsche Telekom AG owns 51% of the HT-Hrvatske telekomunikacije d.d. and the remaining 49% is owned by the Republic of Croatia.

As of the beginning of 2005, HT-Hrvatske telekomunikacije d.d. will be obliged provide access to its unbundled local loop, as well as the services of number portability and pre-selection of operators.

By 2005 the telecommunications sector will be completely privatized, and the new Telecommunications Act (Official Gazette No. 122/03) does not provide for any limitations to the share of foreign ownership in the telecommunications sector, nor any limitations to the entry of new investors (domestic or foreign) to the telecommunications market.

Strategic telecommunications alliances

The main strategic partner of HT-Hrvatske telekomunikacije d.d. is Deutche Telekom AG.

The owner and a main strategic partner of VIPnet d.o.o. is Mobilkom Austria (99 %) and Veèernji list (1 %); VIPnet also has a business contract with Vodafon.

New Services

Significant increase of ISDN (42,1% in 2003) and ADSL connections and services in 2003

Fixed telephony

Differentiated tariff package for fixed telephony implemented in 2003 (Mini Hallo, Hallo Plus).

Mobile communications

HTmobile reported 1.300.000 customers in 2003. Along to mobile telephony following services are implemented: SMS, WAP, MMS, GPRS, Java support, WLAN, mobile Internet.

VIPnet - one of the most successful start-up companies in its field. By the end of the year in 2003, Croatia had a penetration of 55.0% - the Croatian market continues to have growth potential. VIPnet was able to secure 113,000 additional customers in 2003 - in all, more than 1.2 million customers utilize the VIPnet network for their mobile phone services. Croatia is a classical prepaid market, the share of contract customers is 15.4%. Implemented services are: SMS, WAP, MMS, GPRS, Java support, WLAN, mobile Internet.

The growth in the data segment was especially influenced by the high SMS usage (73 SMS per customer and month) and the successful m-commerce service VIP.parking, the predecessor of the Austrian m-parking (2.1 million transactions were made using VIP.parking in 2003, which is a 100% increase in comparison to the year 2002).

Preparations for third GSM operator and concession for UMTS have been finalized by end 2003.

Internet connections

The dominance of dial-up connection: HT reported 479.422 dial-up connections (71,3% of dial-up market) and 506 subscripted permanent connections in 2003 (36,9% of permanent connections market with the increase of 34,2%).

PKI

Financial Agency (FINA) has implemented Register of Digital Certificates by the end of 2002, and started to issue Smart Card driven Advanced Electronic Signature in July 2003.

Cards, Smart Cards

According to the latest collected data for the state of 30 June 2003 (Croatian Chamber of Economy, Banking and Finance Department), 26 banks and two card houses issued in total 5.149.902 credit and debt cards. The share of credit cards in total number is 21,5% and debits 78,5%. In relation to the same period of the last year, the number of cards increased for 26.3%.

Total number of cash dispensers is 1.422 (what in relation to the same period of the last year represents growth of 29,7%) while EFT POS terminals were 27.055 (what represents growth of 40,9%).

Projects of chip cards application are getting to the end of development and start being applied.

ISPs

In 2003, the Croatian telecommunications market has consisted of seven ISPs (HTnet, Iskon Internet, Globalnet, VIP Online, Vodatel, Net4U, VM mre e, europroNET).

Htnet/Hinet: HThinet launched commercial operations in 1996. The firm operates as an ISP arm of incumbent telecommunications operator Croatian Telecom (HT - Hrvatski Telekom). Besides general ISP services, HThinet provides virtual private networking, Web hosting, domain name registration service, Web advertising (banners), etc. Since June, the firm's business users are offered roaming services for 23 countries. Its official Web portal at moj.hinet.hr counting on average more than 300,000 visits a day. In May, it became the first Croatian Web portal to make content available to hand-held PC and PDA users.

HThinet counted more than 350,000 dial-up and a 350 leased line users at the end of 2002. In comparison with the previous year, the numbers increased by 46.7% and 25.9% respectively. The majority of dial-up users were accessing the Internet using subscription-free packages. In June 2002, HThinet introduced pilot version of DSL service. Since November 2002, the service has been offered commercially, but only available in eight major cities in the country. At the end of the year, the firm reported some 1,000 users of the DSL service packages.

VIPNet: In 1998 VIPNet, a consortium of Western Wireless (U.S.) and Mobilcom (Austria), won the second concession to provide GSM services in Croatia. Their operations as the first private competitor to HT began in July 1999. Since then, they have developed rapidly, with 170,000 subscribers in January 2000, and strong acquisition of market share following the monopoly break-up. By the end of 2003, 1.200.000 subscribers were reported.

VIPNet offers a WAP as well as Internet portal and Internet Services in conjunction with their mobile cellular service. The company provides a complete schedule of Internet-related services including e-mail, dial-up connectivity, leased lines, wireless technology, server collocation, Web design and Web hosting, and Virtual Private Networking (VPN). They also offer consulting services to business on Web content and development as well as Internet and Intranet strategy and development.

CARNet - Zagreb University: A regional leader in bringing Internet to Eastern Europe, CARNet was started in 1992. CARNet is a non-commercial, academic ISP owned and funded by the government. The CARNet nationwide backbone, using leased lines and the wide area network (WAN) backbone of HT, connected all academic and research institutions in Croatia. Staff of the Zagreb University Computing Center (SRCE) served as the technical and engineering support for the network.

Since December 2001, CARNet has been connected to GEANT, a pan- European academic network connecting some 3,000 research and educational institutions in 30 European countries.

In February 2002, it launched a new application for users authorization within system of modem access nodes (called CMU). CARNet's WAN connects 193 locations in 23 major cities in Croatia. It is founded on ATM technology and allows internal traffic at the bandwidth of 155Mbps. The number of access modems doubled year-on-year to 2,160 at the end of 2002. At the end of 2002, CARNet had more than 87,000 dial-up users. Compared to the year before, the number has increased by more than 50%.

Since September 2000, CARNet has managed the Croatian Internet Exchange (CIX), a non-profit service enabling more efficient inter-country Internet traffic (without encumbering international networks). Besides CARNet, other founders of CIX were Croatian Telecom, Iskon, AT&T Hrvatska, VIPnet GSM and Croatian Radio Television. CARNet holds the exclusive right to administer and assign Internet domains within Croatia. Other services provided by the ISP include CCERTComputer Emergency Response, helpdesk, education programs, and Internet related publishing (Edupoint, electronic magazine that aims to increase IT usage in the education sector). It also organizes seminars and conferences.

Iskon Internet: Founded in 1997, Iskon Internet was one of the first private challengers to the HThinet's (Croatian Telecom's) monopoly in the ISP area. The company paved the way for Internet connections from any part of the country. The company is 30% owned by local individuals and businesses and 70% owned by foreign investors.

In 2002, the total number of connections provided by Iskon surpassed 74,500. In comparison with the year before the number increased by 28.5%. Some 66,850 home and 7,350 business dial-up users together represented 99.5% of the total number.

Number of leased-line users reached 316. In September 2002, Iskon started covering the Zagreb area with a fixed wireless network. The project resulted from a feasibility study financed by US Trade Development Agency. By the end of the year, the ISP served 22 FWA users.

The company provides a complete schedule of Internet-related services including e-mail, dial-up connectivity, leased lines, wireless technology, server collocation, Web design and Web hosting, and Virtual Private Networking (VPN). They also offer consulting services to business on Web content and development as well as Internet and Intranet strategy and development.

Globalnet: The first private ISP in Croatia, GlobalNET launched operations in 1996. Originally, it was a department of BBM, an SME accounting software vendor. GlobalNET has been a commercial ISP since the end of 1997, and in early 1999 became an independent company. In June 2000, venture capital fund Croatia Capital Partnership invested $5.3 million in the company to acquire a majority ownership stake. Other shareholders include the European Bank for Research and Development and a number of individuals with minor stock shares.

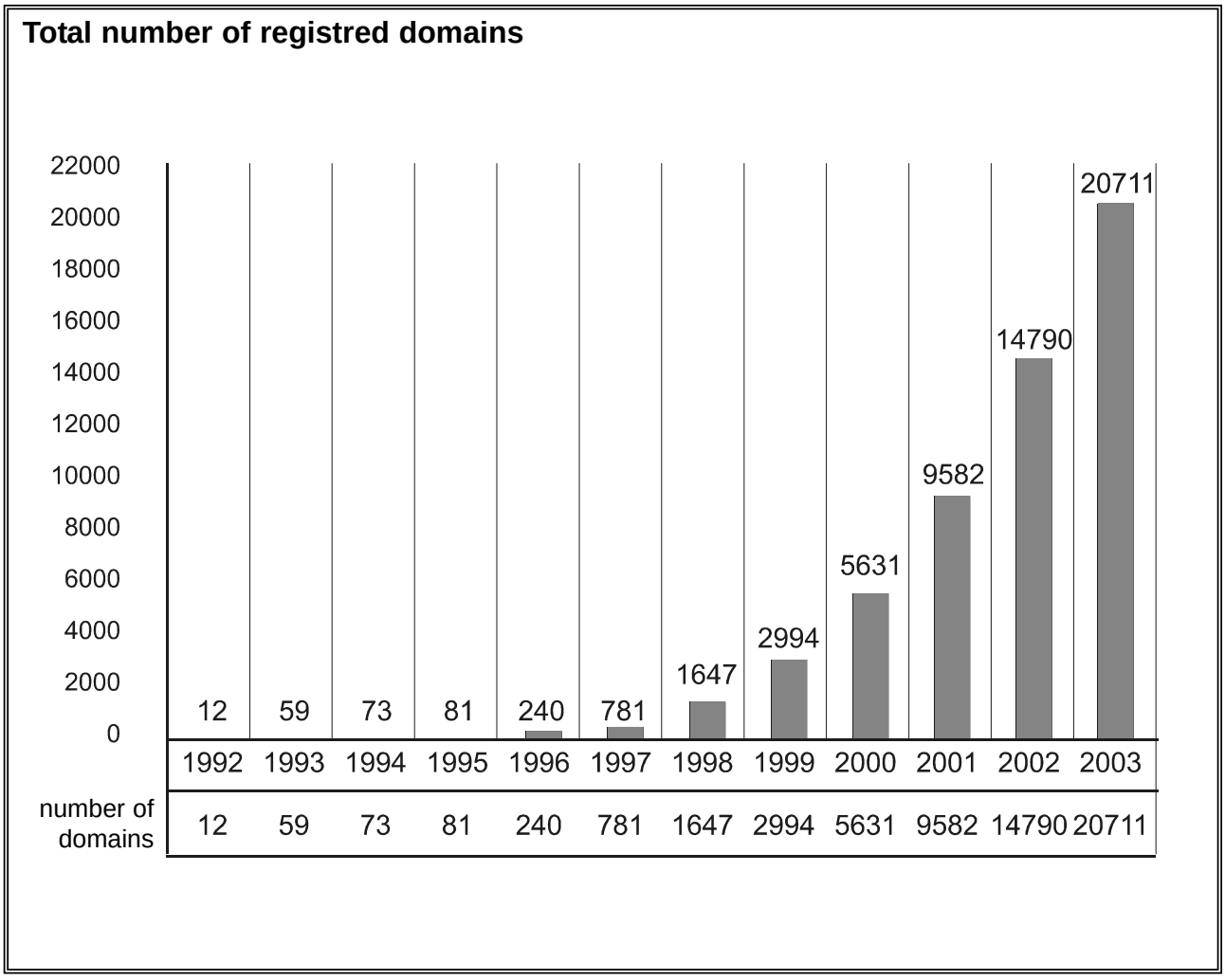
At the end of 2002, GlobalNET served some 20,000 dial-up users. As the number of firms and organizations accessing the Internet through the ISP's infrastructure was some 2,300, home clients accounted for majority of the user base. The number of leased lines renters amounted 130.

In February 2002, GlobalNET introduced a pilot version of fixed wireless Internet access opportunity, the first Croatian ISP to do so. Commercial operations started in June and the service has been available only in Zagreb. The new service, providing Internet access independent from Croatian Telekom, counted 90 FWA service users.
New ISP entrants: Vodafone.

3.4.3.3. INTERNET SERVICES

Internet Domains

CARNet is the body designated by the Government of Croatia as the official registrar for the Top Level Domain (TLD) namespace of Internet domain names for .hr, the TLD of the Republic of Croatia. The cumulative statistics is presented as follows:



Regarding the registered number of entities in Commercial Court Registry, ones having any recorded economic activity in 2003, it can be concluded that 1/3 of them have some kind of Internet activities. Exponential growth of registered domains shows the growing recognition of ICT and Internet as the Infrastructure for Business and/or Services.

Internet payments

Financial Sector (Banks, Business Card Companies), with more then 5.100.000 banking cards, is leading the implementation of secure Internet payments.

Inter-banking Services Institute (MBU), but the banks themselves, has prepared technology and support for secure Internet payments.

New secure Internet payment services are implemented by HT, leader of ISP in Croatia, in the "HTnet Pay Way" and "HTnet Shopping center".

mPayment

INA Oil Company - the early bird applying mobile phone based m-payment pilot implementation for gasoline consumers (INA Gasoline Station Zagreb-Miramarska).

Zagrebparking has implemented new system of payments using VIPnet and Htmobile services. VIPnet reported the successful m-commerce service VIP.parking (2.1 million transactions were made using VIP.parking in 2003, which is a 100% increase in comparison to the year 2002). Innovative implementations have attracted the interest of cities as Wien, London, and many large cities of the world.

E-Banking

The whole banking sector in Croatia has been implemented Internet banking for private and corporate customers as one of the distribution systems for their services.

E-Commerce

Due to respective developments of electronic card business in Croatia (and the first implementations of Smart cards), connected with electronic payments, B2C e-Commerce component is achieving strong economic and professional shape.

Aggregate revenue

An IDC survey of the 2002 B2C market indicated that the aggregate revenue totaled at around $9 million. Tourist agencies generated the most revenue in 2002, around $3.03 million, which translates to about 60% of the total B2C market revenue in 2002. This sum was generated in about 32,000 transactions, with the customer base consisted mostly of foreign tourists.

Online computer shops generated about $1.1 million in 2002, about 25% of the total 2002 B2C market revenue. Online bookstores in 2002 made up around 7% of the B2C market, generating revenue of around $0.4 million in about 17,560 transactions. Online shops for electronic and electric household appliances and accessories make up about 4% of the 2002 B2C market. They have generated revenue of around $0.2 million in more than 6,000 transactions. Sales of consumer goods online did not prove very successful, constituting only about 4% of the total 2002 B2C market share.

3.4.4. MACEDONIA

3.4.4.1. GENERAL TELECOMMUNICATION INFRASTRUCTURE [46]

The country has a well-developed communications network with teledensity of about 26.7 lines per 100 inhabitants. The country has direct fibber optic links to the European backbones. The National Telecommunications Company - Macedonian Telecommunications has been privatized in 2001, as the new majority owner with 51% of the shares is Matav from Hungary (60% owned by Deutsche Telecom).

The exclusivity period for fixed services will end on 31 December 2004 and privatization is expected to pave the way for full liberalization in telecommunications. The market for data communications including Internet access is unfortunately not fully liberalized.

MT is in possession of the first GSM license in the country through its wholly owned subsidiary MobiMak. For the further liberalization of the GSM mobile phone network, a second license for providing GSM services has been awarded to OTE from Greece. They have started with their work in June 2003.

The following data give the overall situation about the "Network and subscribers in Telecommunication traffic".

	2000	2001	2002
Telephone exchanges (telecommunication network units)	385	446	418
Telephone lines	805885	792036	793132
Single lines	645563	670818	718517
Double lines	151580	110100	61869
ISDN BRA	8224	10561	11930
ISDN PRA	283	351	614
2Mbps	235	206	202
Telegraphs lines	800	800	800
Public pay phones, lines	1811	1835	1811
INTERNET lines	10074	22044	36639
MAKPAK lines	1528	1498	1530
Mobile lines	170000	17000	450000

[46] Ministry of Economy, http://www.economy.gov.mk

	2000	2001	2002
Telephone subscribers	507316	538507	538278
Single telephone subscribers	431382	493343	549001
Double telephone subscribers	73477	41075	22862
ISDN BRA	2318	3825	6075
ISDN PRA	108	237	306
2Mbps	31	27	34
Telegraphs subscribers	400	325	306
Mobile subscribers	99944	221336	366348

Source - Statistical Yearbook of the Republic of Macedonia, 2002

The Macedonian telecommunication market estimated volume amount is about 600 million Euros[47], and about 50% of the market share belongs to Macedonian Telecommunications (MT), which also includes the cellular provider, Mobimak.

In 2001, the teledensity is approximately 26.7 lines per 100 inhabitants[48]. In 2002, there are a total of 594,213[49] fixed lines including ISDN, which makes the teledensity 29.7 lines per 100 inhabitants. Cellular users are almost six per 100 inhabitants. Currently there are two GSM providers: Mobimak and the second mobile operator, Cosmofon, began with work in June 2003. At present Mobimak has 576.673[50] users, and for Cosmofon estimated number of users is around 30,000-40,000.

Data from the Bureau of Statistics of Macedonia for 2000 state that the PC penetration was 9.24 PC's per 100 households or 26.93 per 1000 inhabitants or 55,000 PCs in total[51]. In 2002, the computer penetration (number of computers per capita) is estimated to have been five computers per 100 inhabitants[52].

At the moment, the major providers of public telecommunication services for transfer of data - Internet (ISP) are: "Macedonian Telecommunications" through its subsidiary "MTNet" (www.mt.com.mk), "Unet" (www.unet.com.mk), PE "Macedonian Post" (www.porta.com.mk), "On Net" (www.on.net.mk), "SoNet" (www.sonet.com.mk), "Macedonia On Line" (www.mol.com.mk) , "Euronet" (www.euronet.com.mk).

According to ITU (International Telecommunication Union) Macedonia took somewhere between 67th to 71th place from among 178 economies (with a value of 0.48) according to the ITU's DAI[53] Index and is classified in the countries with "medium access". The ITU's Digital Access Index (DAI) measures the overall ability of citizens to access and use information and communication technologies (ICTs). It is based on eight variables, covering five areas, to provide an overall country score. The areas are availability of infrastructure, affordability of access, educational level, quality of ICT services, and Internet usage. The results of the Index point to a potential obstacle in ICT adoption and can help countries identify their relative strengths and weaknesses. It covers a total of 178 economies, which makes it the first truly global ICT ranking. First three countries on this list are: Sweden, Denmark and Iceland with 0.85, 0.83, and 0.82 respectively and compose the "high access" list of countries. According to this methodology, there are two more lists: economies with "upper access" and economies with "low access".

Although Macedonia has developed good digital fixed telephony and relatively good coverage given the economic indicators the country, the overall situation, however, of the telecommunication sector in the country is not that good. This applies particularly if we take into consideration the situation with the regulation set by the EU in this area, and especially the fact that the Telecommunication Directorate is not an independent regulatory body, as it should be, but it is within the frameworks of the Ministry of transport and communications. Due to the abovementioned complications in regard to the market liberalization in the filed of fixed telephony (up to the beginning of 2005 MT will hold the monopoly in this field), despite the 100% level of digitalization of the infrastructure executed in 2002, still, until the appearance of a new operator, which can happen the next year, no benefits with lower tariffs and faster penetration of broadband Internet are expected. The upcoming liberalization in 2005, and a pending new law for Telecommunications may soon increase the competition and the new operator(s) will be able to access the unbundled local loop and install their xDSL equipment, and cable Internet connectivity. In addition, it is expected that the new Telecommunication Law will permit the VoIP service that will dramatically reduce the cost of international phone calls.

3.4.4.2. GENERAL TELECOMMUNICATION SERVICES

The overall situation with telecommunication infrastructure in Macedonia is good, but still the monopoly exists for some services. Lack of competition causes the implementation of new technologies in the country to be late and high prices for the cervices. On the other hand, the economic situation of the citizens, as well as the high prices of the services is the reason for the 6% Internet access of the population. The number of updated Macedonian sites amounts to several hundreds. According to the current regulation in Macedonia, MT provides basic telecommunication services, including all local, long distance and international traffic, leased lines, cellular mobile services, and value added services including data communications and Internet access. In addition, Cosmofon offers cellular mobile services, and there are several ISPs that offer Internet access.

The situation with ISPs is a little bit complicated because even from beginning from July 2000 the ISPs are not obliged to use the links provided by MT to access the Internet, and in addition to their links to MT, several ISPs have established their own satellite connections, but

47 A Strategy to Develop the Information Technology (IT) in Macedonia with special reference to the Software Development, GTZ, 2003

48 World Bank data

49 www.mt.com.mk

50 http://www.mobimak.com.mk/makedonski/About_Mobimak/fakti.htm

51 Statistical Bureau of the Republic of Macedonia

52 Statistical Bureau of the Republic of Macedonia

53 www.itu.int/ITU-D/ict/publications/wtdr_03/material/flyerWTDR03.pdf

the infrastructure is mainly the one owned by MT. The network infrastructure of MTNet consists of modern Cisco-based network, providing basic services for the Internet access.

Dial-up service is achieved through 5400 and 5300 platform of the Access Server-and with a sufficient capacity for servicing the users without any congestion. According to the traffic capacity, part of these Access Servers is based in Skopje, and the other part is distributed throughout other cities in Macedonia.

Leased Line service in Skopje is obtained through 3600, 4000, 7200 platforms of the Cisco routers with adequate software for support of IP services as VPN, QoS etc. In order to obtain access with leased line outside of Skopje, 3600 and 7500 Cisco routers, part of the IP Backbone network, are used. Equipment of the renowned RAD producer from Israel is used as a last-mile accessible platform, and in some cases, other transfer networks of Macedonian Telecommunications are used. The scalability of the network provides possibility of adequate upgrade of the facilities, which will meet the requests of the users in the long-term.

The connection of the accessible network equipment with the international links is achieved through Cisco Catalyst 4006 Switches, which are connected through optical links with the core routers of the series Cisco 7606. The international links terminate on these routers with the capacity of 2 x 34Mbps land link with MATAV, 4 x 2Mbps land link with Deutsche Telecom and 4Mbps satellite link with SES Americon.

The ISPs offer access through dial-up (PSTN up to 56 kbps or ISDL 64 or 128 kbps), DLL (Digital leased lines with 64 kbps up to 2048 kbps), wireless, and also together with other companies they offer web design, multimedia, and other web related services.

3.4.4.3. LIST AND PRICES OF SOME TELECOMMUNICATION SERVICES

a) Internet accessible services

- Dial-up access via PSTN at a speed of 56kbps;
- Access via ISDN network at 64kbps; 128kbps
- Access via pre-paid card
- Access via leased lines
- ADSL[54] (for 384/64 Kbps download/upload 95 USD installation fee, 60 USD monthly fee; for 768/128 Kbps download/upload 190 USD installation fee, 330 USD monthly fee);
- IDA (Internet Direct Access)

b) WEB services

Preparation of WEB sites, WEB hosting services, preparation and update of WEB sites, promotions and advertising at WEB portals, and others with different prices depend on complexity. These range from packages with domain registration, monthly traffic up to 2GB, 5 e-mail accounts, FTP access, and 5MB Web Space for 60 Euros; up to packages which offer domain registration, monthly traffic up to 50GB, 100 e-mail accounts, scripts (asp, php, jsp, .net, MySql, Perl, Python, CGI), E-Store solutions and Merchant accounts, FTP access, and 500MB Web Space for 1.530 Euros.

c) Data Transmission

- IP VPN;
- Leased lines (Capacity of 64 Kbps with 500 USD[55] connection fee, and 150 USD monthly fee plus additional 2.5 USD/km; and up to Capacity of 2Mbps with 3,000 USD connection fee, and 1,200 USD monthly fee plus additional 27 USD/km)
- Frame Relay (Capacity of 64 Kbps with 1,000 USD[56] connection fee, and 120 USD monthly fee plus additional 0.007 USD/kilosegment; and up to Capacity of 256 Kbps with 3,100 USD connection fee, and 280 USD monthly fee plus additional 0.007 USD/kilosegment)
- X.25 (Capacity of 1200 bps with 1,000 USD[57] connection fee, and 58 USD monthly fee; and up to Capacity of 64 Kbps with 1,000 USD connection fee, and 155 USD monthly fee)

d) Voice Services[58]

- Business Telephone Line - Price List

Installation costs	50 € in denars
Monthly fee	
Standard subscription	600 den
Monthly detailed bill (delivered by e-mail)	91 den

- ISDN 2 - Price List

Installation costs	82 € in denars
Digital network adapter NT digital	3.000 den
NT net	5.000 den
Monthly fee	
Standard subscription	810 den
Comfort (two additional numbers - MSN)	1.080 den

- ISDN 30 - Price List

Installation costs	82 € in denars
Connection fee	105.000 den
Monthly fee	
Standard subscription	8.100 den
Comfort fee (up to 100 numbers)	10.800 den

e) Mobile services

- GSM pre-paid and post-paid packages (the lowest subscription for the post-paid costs roughly 8 USD, and the prices of the impulses are varying according to the operator and the offered package as follows: 0.15 USD/min to 0.43 USD/min for Cosmofon, and from 0.18 USD/min to 0.57 USD/min for Mobimak. The prices of the pre-paid packages are varying from 0.005 USD/sec. in the cheap tariff and 0.007 USD/sec. in the expensive tariff for Cosmofon, and 0.16 USD/min. to 0.8 USD/min. for Mobimak;
- Internet Access[59]:
  WAP through GPRS for 0.1 USD/ 10kb
  Internet through GPRS for 0.6 USD/ 1MB
- SMS 0.1 USD per message
- MMS
  <32KB for 0.5 USD per message
  >32KB for 0.7 USD per message
- Mobile expenses[60] (the payment of products and services by mobile telephone, using the permitted limit of 1000.00 denars per month)

f) Video Solutions

- Video conference over IP networks
- Video surveillance and alarm handling

[54] Because of the monopoly position, only MT could offer this service on the market

[55] http://www.mt.com.mk/eng/zanas/mtnet.htm

[56] http://www.mt.com.mk/eng/zanas/mtnet.htm

[57] http://www.mt.com.mk/eng/zanas/mtnet.htm

[58] VAT is not included in the prices. 1 USD = 51.85 MKD

[59] Mobimak only

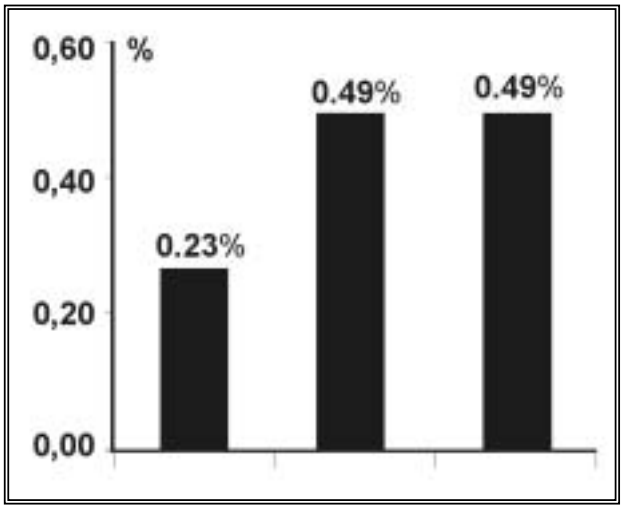
[60] Mobimak only

3.4.5. MOLDOVA

State support for ICT infrastructure development

Annual allocation for informatizations is composed of allocation from state budget, and credits, grants, donations, etc. In 2003 the general allocations equalled to 283,3 mln. Lei (1 USD = 12 lei), that is by 69% more than in 2001. Most of the financial resources, more than 91%, for informatization are allocated in the capital. At the same time the allocations from the state budget in 2003 grew by 3,5 times comparative to the year 2001. The problem that the state budget faces is that budgetary resources for IT development are not joint into one compartment, which means that this resources are devided into small summs of money for many public administration bodies.

Taking into account the experience of other states, the budgetary allocations for IT development should make 1% from the state budget. In the Republic of Moldova this amount equal to less than 0,5% from the state budget.



Allocations from the state budget of the Republic of Moldova (%)

ICT Infrastructure - general data

Infrastructure of an information society is characterized, first of all, by type, length and capacity of telecommunication lines. The table below contains a series of indicators meant to illustrate processes that had taken place in Moldova before 2003.

Indicator	2000	2000
Fibre-optical lines in the overall length of interurban telecommunications lines via cable (%)	23.9	43.3
Electronic and quasi-electronic main telephone lines capacity in the total capacity of automatic main telephone lines (%)		
Urban	54.9	60.0
Rural	27.7	62.2
Percentage of digital transmission channels (lengths) in the total length of interurban telephone channels	69.1	99.6
Percentage of which fibre optical	63.3	98.0
Subscribers to mobile radio- and telecommunications:	109 643	338 300
Subscribers to the data transmission network	47 279	66 086
Networks with Internet access	223	415

Table shows a high potential (yet to be realized) for IT infrastructure development, and also a considerable growth (by 50%) of the number of subscribers to mobile radio- and telecommunications in 2002.

TV penetration

A very important indicator from the point of view of IS building possibilities is the degree of penetration of radio and television. The data in the following table emphasize achievements, and also marks the problems in this field.

Indicator	2000	2000
Percentage of country's population that is able to receive TV programs:		
National program	99.0	99.0
Two programs	95.9	95.9
Three or more programs	89.2	89.2
Percentage of country's population that is able to receive radio programs:		
Radio broadcast programs	100.0	100.0
Commercial radio broadcast programs	30.0	57.7

Technological possibility for a digital television undergoes testing. As we have already mentioned, only one cable TV operator in the capital has launched Internet connection service through its technical facilities.

Fixed telephony

Theoretically, it is possible to access Internet from any household provided with a fixed telephone. However, practically there is no guarantee to that, especially for telephone lines connected to old telephone stations (analog), and moreover, duplex telephone numbers do not allow even a theoretical connection to Internet. In addition to the problem of errors and failures in the old networks, there is a problem of reduced capacity, which cannot ensure necessary quality and speed for data transmission. Indicators of fixed telephony are concentrated in the following table.

Indicator	2000	2000
Automatic main telephone lines	928	995
Total capacity of telephone main lines (thousands of numbers)	644.9	749.3
Telephone sets in public network or with access to it (thousands)	603.6	719.3
Main telephone sets in public network (thousands)	583.8	704.0
Households with telephone sets in the public network or with access to it (thousands)	513.3	625.7
Households with main telephone sets in the public network (thousands)	505.2	619.2
Households with telephone sets in the public network or with access to it, per 100 citizens	13.9	17.3
Public telephone sets in urban and rural network (including universal sets)	1547	1685
Length of interurban telephone channels, in thousands of km	1103.9	1978.4
Number of interurban public telephone sets	116	53

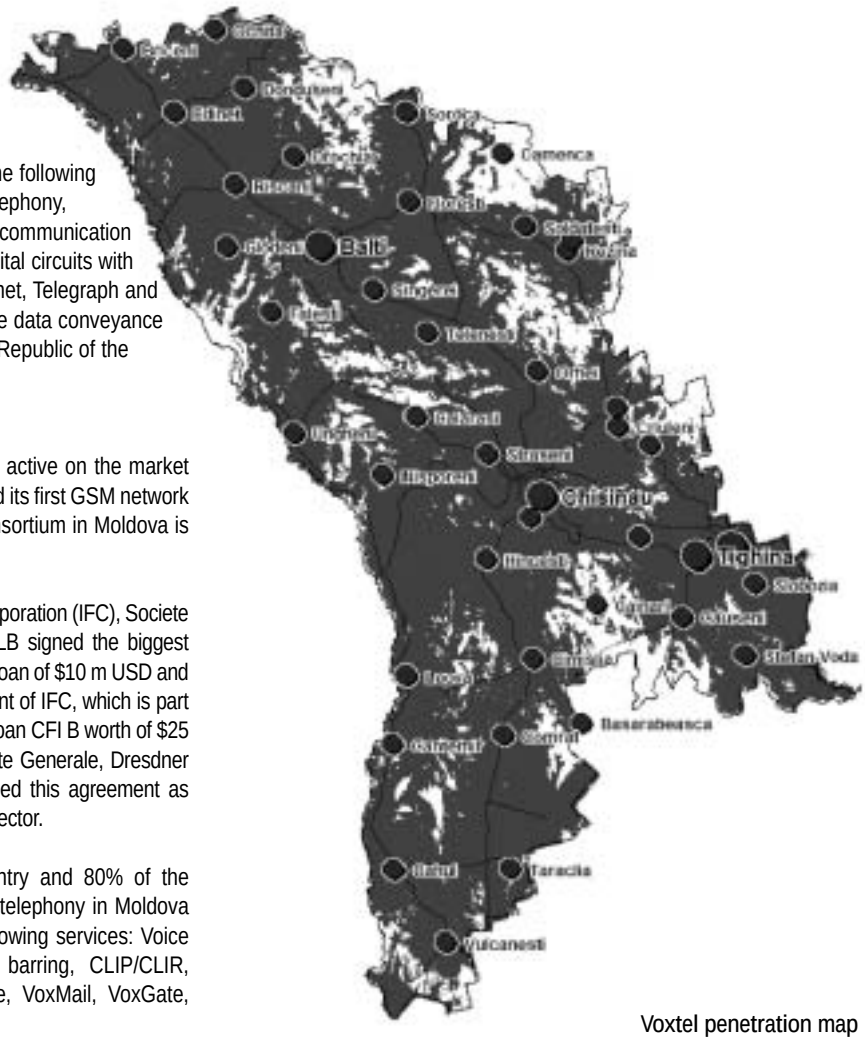
The main provider, Moldtelecom (http://www.moldtelecom.md/), offers its clients the following telecommunication services: fixed and mobile telephony, including video-conferences, building of new telecommunication networks, CrossNet communications, (rent of digital circuits with capacities from 64 Kbps to 2 Mbps), ISDN, Internet, Telegraph and telex, cable television. It's the only operator of the data conveyance services, which covers the whole territory of the Republic of the Moldova.

Mobile telephony services

VOXTEL Company (http://www.voxtel.md/) is active on the market since February 1998. In October 1998, it launched its first GSM network in Moldova. Total investment of the VOXTEL consortium in Moldova is estimated to have reached $65,000,000 USD.

On April 8, 1999, the International Financial Corporation (IFC), Societe Generale, Dresdner Kleinfort Benson and West LB signed the biggest financial project in Moldova's economy - a primary loan of $10 m USD and a secondary loan of $5 m USD, both on the account of IFC, which is part of the World Bank. There is, as well, a syndicated loan CFI B worth of $25 m USD on the account of the French Bank Societe Generale, Dresdner and West LB - the two German banks that signed this agreement as institutions specializing in the telecommunication sector.

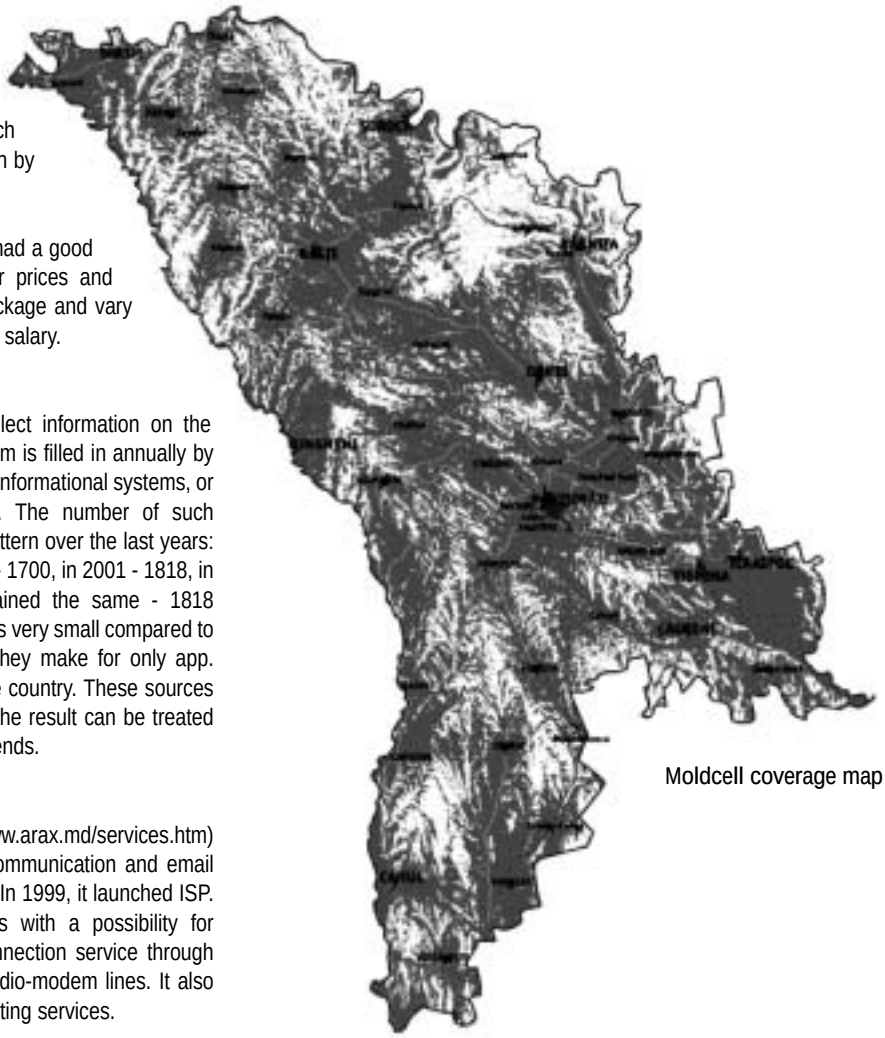
At present, Voxtel covers 67% of the country and 80% of the population. Voxtel is the first operator of mobile telephony in Moldova that attracted 300,000 clients. It extends the following services: Voice Mail, Call forwarding, Call waiting/Call hold, Call barring, CLIP/CLIR, Cronos, InfoLine, InfoCurier, VoxText, VoxPage, VoxMail, VoxGate, Voxtel Link, Voxtel DataFax, VoxPlus.



Voxtel penetration map

Moldcell, provider of GSM mobile telephony, (http://www.moldcell.md/), started its activities in April 2000. This company covers over 71% of the country and 76% of Moldova's population. Moldcell was the first operator in Moldova to launch such services as SMS, Roaming, WAP and taxation by second.

Competition between the two companies had a good impact, from customer's point of view, over prices and quality of services. Prices depend on the package and vary between 5% and 20% of the average monthly salary.



Moldcell coverage map

Internet and Information Service providers

The statistics form 1-INF is used to collect information on the degree of informatization of Moldova. This form is filled in annually by businesses that hold informatization facilities, informational systems, or who extend services in information sector. The number of such businesses showed the following evolution pattern over the last years: in 1999 there were 1500 businesses, in 2000 - 1700, in 2001 - 1818, in 2002 their number did not grow and remained the same - 1818 businesses. We should say that their number is very small compared to the total number (285149 businesses), i.e. they make for only app. 0.7% of the total number of businesses in the country. These sources cannot provide us with absolute figures and the result can be treated only as a survey meant to establish certain trends.

Some of these companies are:

Internet service provider Arax (http://www.arax.md/services.htm) was set up in 1992. Until 1999, it offered communication and email services based on its own computer network. In 1999, it launched ISP. It currently owns 90 dial-up incoming lines with a possibility for extension, if necessary. It offers Internet connection service through dedicated lines (from Moldtelecom). It has radio-modem lines. It also offers web-design, programming and web-hosting services.

The Globnet company offers Internet access (including ADSL), project development and installation of computer networks, consulting services in IT and telecommunications.

The Moldpac company (http://www.moldpac.md) offers its users a data traffic network Moldpac with permanent access: 24/24, 7/7, 365 (366) days a year.

Uniflux-Line network (http://www.e-centru.md/) is a multi-service network of general use for data traffic in the Republic of Moldova. It is a system of data traffic of various types (data, voice, video), based on the technology of package commutation (ATM and Frame Relay).

The main function of the Uniflux-Line network is to offer a large spectrum of telecommunication services for all those who wish (data and voice transport, access to various informational networks and systems of general and special use); it suggests creation of basic infrastructure for special projects, especially corporative telecommunication networks.

The Republic Informatics Center (From 2001, State Enterprise MoldData http://www.molddata.md/ was set up in September 1993 and operates in conformity with the "Concept of Informatization of the Society" adopted through the Government Decision of Moldova, No. 415 of July 5, 1993, and " Draft Guidance for Informatization of Society", adopted through the Government Decision, No. 155 of March 6, 1995. It extends such services as Research and project development in informatics, Approval and implementation of information technologies, Informatization of Public Administration, Development and Management of General Databases, training in IT, Informational Services and Data transmission, including Internet services on dial-up and dedicated lines.

Prices for its Internet dial-up services range from $5 US dollars per month for limited access (60 hours) and $10 US dollars per month for unlimited access.

The list can be continued, with almost 70 Internet service providers operating on the market and over 3,000 Internet sites of individuals or legal entities of Moldova.

There are over 1,800 officially registered IT companies. Most of them started their businesses from selling imported hard- and software, and proceeding to their own domestic assemblage of computers. Today, over 70 companies extend soft development services or adapt some already existing products to their customer's requirements. Below you may find some examples of IT companies.

ACCENT ELECTRONIC S.A. (www.accent.md) is the only Moldovan Company that holds a special license Nr.1 issued by the Intelligence and Security Service, which enables the holder to extend services of informational security to enterprises and organizations, employing therefore special devices.

ISABEL S.A. company (http://www.babilon.md) was founded in July 1994. In 1995, the company set up a division to deal with computers and peripheries. The tasks of this division were: computer market study in Moldova and perspectives for Computer Industry development in general. In 1996, ISABEL S.A. Company becomes an exclusive representative in Moldova for the largest world companies Nisko (leader in development of electronic meters with SmartCard) and Telrad (world leader in telecommunications). In August 1997, the company opened a computer shop - Computer Center BABYLON, which represents the whole spectrum of computers and peripheral devices. Besides, the company deals with software development, web design, and advertising.

Dekart company (http://www.dekart.md/index_ro.html) pursues research & development activities in IT and smart cards. We can mention here some of its products: DEKART Digital Signature System®, Regional Media Pay System that uses smart cards and certification of transactions (DEKART Media Pay®), System of programs for cryptographic protection of data on a PC by using smart-technologies (DEKART Private Disk®), Soft and Technical Complex to store cryptographic keys and secret information by using smart-technologies (DEKART SmartKey®), Complex for Software Protection against Unapproved Copying (DEKART Program Protection®), Secrets Keeper Complex that ensures protection of information against unapproved access, a Set of Applications for Testing Aleatory Consequences (DEKART Random Run's Tests®), Center for Certification of Public Keys (DEKART Certification Authority®).

The company Deeplace (http://deeplace.md/) creates and implements the IT solutions for businesses.

The number of Internet users (with an account) was 13280 persons in 2002, and 15952 in 2003. Estimated number of Internet users (Internet café, office,) in 2003 is about 320 000 (250 000 in 2002).

3.4.6. SCG - KOSOVO

Telecommunications infrastructure suffered heavy damage during the conflict. Many facilities were completely destroyed including the main transit center in Prishtina, a 10,000 subscriber switch in Prishtina, the transmission backbone and many distribution networks. Before the conflict, Kosovo had the second lowest telephone penetration rate in Europe with about six lines per 100 persons. Very little investment was made in ICT infrastructure through the 1990s and much of the equipment was already very old. Although most local exchanges remained in service during 1999, there were no spare parts and no test equipment, tools or vehicles for maintenance[61].

PTK

Under the authority of UNMIK, PTK is the sole official provider of telecommunications services in Kosovo. It operates public telecommunications infrastructure and is included in the Kosovo Consolidated Budget as a public enterprise (Publicly Owned Enterprise - POE).

PTK has been given the authority to provide post and telecommunication services in Kosovo on an interim basis, using existing public postal and telecommunication assets. PTK initially restored a minimal microwave network linking major towns by which the local, long distance and international telephone services recommenced in major centers. Besides the fixed telephony services, PTK consists of two other subsidiaries: Mobile Operator Vala900, and ISP DardaNET. (See: www.ptkonline.com)

Domestic transmission system of the PTK is mainly based on digital microwave radio systems, PDH and SDH technology. The PTK's backbone telecommunication system is based on two active transmission stations, Goleshi and Cvileni:

- Prishtina - Goleshi SDH (5 + 1) x 155 Mbps
- Goleshi - Cvileni SDH (3 + 1) x 155 Mbps

PTK's fixed network is arranged in a star topology. The main exchange is located in Prishtina with six other regional centers connected to it. PTK connects with Kosovo's neighboring countries: Serbia, Macedonia and Albania.

- Fibre optic connection to Belgrade/Serbia:The fibre cable consists of 26monomode fibres. The international 381-code transit runs through this cable from Prishtina exchange, via 12xE1.
- Radio link to Skopje/ Macedonia (PDH MW - 34Mbps)
- Radio link to Tirana/Albania (SDH MW -155Mbps)

All international traffic from/to the mobile subscribers is directed over the International Switch of Monaco Telecom (00377). A link to Monte Carlo, Monaco, is established with SDH transmission via Albania. From Durrës, Albania, under-sea optical cable runs to Monte Carlo, via Milan, Italy. The satellite link to Monaco is used for overflow and fallback.

Main IP uplinks of DardaNET are SeaBONE - Telecom Italia, Austrian Telecom and MTnet of Makedonski Telekomunikacii. Connection to Milan (SeaBONE) uses SDH link to Tirana, then via under-sea optical cable it is forwarded to Milan. The connection with Austrian Telecom goes through the same route to Albania and then to Dubrovnik, Zagreb, Clagenburg, finally on to Vienna. The connection to Skopje uses PTK's PHD Digital Radio Link to Ramno, Macedonia. From there to Skopje, an optical cable owned by MTnet is used.

The Prishtina Optical Ring connects PTK exchanges as well as government facilities.

PTK fibre infrastructure in Prishtina: (24 monomode fibres in each direction).

- Dardania - Taslixhe (155 Mbps/ISKRA)
- Iliria - Dardania (STM 16/ISKRA)
- Dardania - Kodra e Diellit (34 Mbps/Iritel)
- PTK ring (Iliria - KPS - Luan Haradinaj street - Rilindja - Grand Hotel - Mother Theresa Street)
- Pllanika - Rilindja - (24 monomode fibres)

Government Data network in Prishtina

- Government building - Iliria - (24 monomode fibres)
- Iliria - Political parties - (24 monomode fibres)
- Iliria - Ministry of Finance (24 monomode fibres)
- Iliria - Ministry of Public Services (Gërmia) - (24 monomode fibres)
- Iliria - New Economic Faculty (MLSW) - (24 monomode fibres)

Telephone /Fixed

PTK is the sole provider of fixed telephony services in Kosovo. ISDN Services are restricted to Prishtina and few pockets in Prizren area.

[61] Post and Telecommunications, EAR, Economic Reconstruction and Development in South Eastern Europe, www.seerecon.org/kosovo/documents/reconstruction2000/post.htm

Public booths with pay-card phones have been deployed all around the country. There 261 public booths in total; 63 in Prishtina region, 40 in Prizren, 38 in Gjilan, 35 in Pejë, 32 in Mitrovicë, 32 in Gjakovë and 21 in Ferizaj. Public phones are also installed in 109 post offices. The following table presents the state of the telephone capacity, connected users, usage rate and total impulses over 2000 - 2003 (data from SOK).

Telephone capacity in Kosovo	2000	2001	2002	2003
Telephone Capacity of Centrals	136,640	127,252	139,132	158,215
Number of Connected Telephones	80,795	94,582	103,742	101,059
Rate of Capacity Usage	59%	74%	75%	64%
Total Impulses	69,798,138	66,252,609	75,207,483	64,669,988

Note: PTK only, Telecom Serbia not included rtcl. The price for one impulse is 0.05 Euro according to SOK's CPI measurement.

According to the Ministry of Transport and Communications, the actual number of connected subscribers is 111,292 or around 6% (teledensity/fixed).

The capital Prishtina has the best infrastructure. It is served by Siemens EWSD Switching System. It has two hosts in Prishtina; Dardania and Iliria, each with 23.000 installed users. In addition, remote units have been installed in Shtime and Malishevë cities and in numerous points in the Prishtina suburbs, a number of nearby villages as well as the Prishtina airport. However, the local-loop from these remote points is lacking or not present at all. The investment in local-loop has finally started after a long wait caused by the complicated approval procedures of UNMIK through Kosovo Trust Agency. PTK has announced plans to expand the fixed telephony capacity to 450.000 subscribers. (See: www.ptkonline.com)

The infrastructure in other cities in Kosovo is poorer than in Prishtina. The switches in use in main cities and their capacities are:

- Mitrovicë: Ericsson AXE10 (10.000) and NikolaTesla/Ericsson ARF102 Cross-Bar mechanical switch (10.000)
- Pejë: Alcatel/Iskra Metaconta M10 (5000) and ARF102 (10.000)
- Gjilan: Alcatel/Iskra Metaconta M10 (10.000)
- Gjakovë: Alcatel/Iskra Metaconta M10 (10.000)
- Prizren: Alcatel/Iskra Metaconta M10 (5000), ARF102 (10.000), ARF50 (5000),
- Ferizaj: ARF102 (10.000)

IskraTel Company upgraded the already installed base of IskraTel switches to the latest SI 2000 Switch free of charge. Several small cities and places in Kosovo had been lucky to receive a donation from IskraTel: Therandë, Viti, Dardanë, Mamushë and Nikaj. The capacity of these switches is from 1000 to 3000 numbers.

Tariffs: 1 (high peak), 2 (low peak) - is available every day from 15.00-17.00 and 21.00-07.00. On Sunday's it is low peak 24 hours round (00.00 - 24.00). The table below presents the price list for current services:

Internal communication prices	Tariff 1 (High peak)	Tariff 2 (Low peak)
Local calls	0.04€/3min (1 impulse)	0.02€/3min (1 impulse)
Zone I (Same network group - Prishtina and nearby locations)	0.04€/1 min.	0.02€/1 min.
Zone II (other location in the country)	0.06€/1 min.	0.02€/1 min.
Zone III (Montenegro; Serbia)	0.12€/1 min.	0.06€/1 min.
Fixed line - Vala 900	0.16€/1 min.	0.08€/1 min.
Fixed line - Other mobile tel. providers (063, 064, 069)	0.32€/1 min.	0.16€/1 min.

Services offered by PTK include CLIP (caller ID), DIVERT, CLIR (ID withheld), HOLD, SMET, CFU (call forwarding unconditional), CW (call waiting)

- Connection fee: €150 for residential customers, €300 for businesses customers
- Telephone relocation fee: €15

PTK offers leased lines in the whole territory of Kosovo. Initial connection fee is €500. The price for a 64kbps leased line is (€200 + €1.5 per each kilometer air -distance) /month.

PTK announced that all prices would drop significantly in view of future implementation of the Kosovo Optical Ring.

Telephone /Mobile

Total number of Mobile Phones in Kosovo by mid-2003 including both operators; VALA900 and Mobtel was 315,000 (source: SOK) , presenting around a 15% mobile penetration ratio.

The frequency allocation is controlled by KFOR and UNMIK's Frequency Management Office. The current allocation of the 900 MHz band allots 50 channels to VALA900, 50 channels to Mobtel and 25 channels are reserved for KFOR/UNMIK Closed User Groups.

VALA900[62] - (www.ptkonline.com): A new GSM - 900 MHz network, VALA900 was created as a kind of joint venture between Telecommunications company in Kosovo and Monaco Telecom. In September 2000, this mobile network had approx. 46,876 subscribers.

Currently, according to the Ministry of Transport and Communications this operator has 268.043 subscribers.

[62] "Kosovo Telecommunications and Postal Sector", September 2000, www2.ifc.org/seed/PDFs/Internet_and_e-commerce_in_Kosovo.pdf

The cellular service does not provide data access to prepaid accounts.

- Network Type: GSM 900
- Handset Code VALA 900
- Network Code 212 01
- Network Status Live February 2000

"Mobilne Telekomunikacije "Srbija" BK-PTT" company (www.mobtel.com) was present in Kosovo before the war; and although unlicensed after the war, it continues to work in some parts of the country.

- Network Type GSM 900
- Handset Code YU MOBTEL
- Network Code 220 01
- Network Status Live October 1996

Internet Service Providers

DardaNET - part of PTK public enterprise provides Internet services through leased line Internet access, analog dial-up, and ISDN BRI dialup. In a first phase, Internet access through dedicated lines was offered in centers where DardaNET had managed to establish Points of Presence (POP). The center in Prishtina connects to seven remote POP's in other cities.

DardaNET offers analog dial-up access services of maximum 56kbps. A unique free dial-up offering has come up through a partnership between DardaNET and PTK's Landline subsidiary. The idea came to appear when it was determined that the landline infrastructure usage was very low, especially in the capital Prishtina. In order to increase the usage of otherwise idle capacity, the telephone charges for calls were dropped to -25% (minus 25%) of the local rate. All calls to the dial-up service made throughout Kosovo are treated as local rates. However, given the limited bandwidth with remote cities, there are only number of lines (ten or twenty) reserved for the free dial-up calls from these cities. The total number of incoming dial-up lines is 300. The total bandwidth dedicated to the free dial-up service is 1- 1.5 Mbps.

DardaNET's main business is providing Internet through leased lines ranging from 256kbps to 2 Mbps. The price for the service ranges from €680 for 256kbps to €2150 per 1Mbps.

Dardanet connects internationally through Telecom Italia - SeaBONE and Telecom Austria, through Durrës Albania (via MW Prishtinë - Tiranë), property of PTK and AlbTelecom sh.a. Redundancy link is provided through Macedonian Telecom, MTnet (via Prishtinë - Shkup link), established by PTK and Makedonski Telekomunikacii.

IPKOnet (www.ipko.net) - was the first ISP in Kosovo. It is a former NGO spin-of, now a successful private business. It has its own microwave backbone 155 Mbps - "National Data Network" as well as 2.4 and 3.5 GHz distributions and a dial-up service. Renting transmission towers from KTTN, this network covers majority of the cities in the country. The network is capable of delivering voice, video and data services with distinct quality of service (QoS) features, network monitoring, bandwidth management, security features and more. IPKOnet's National Data Network is a combination of fixed wireless point-to-point microwave radios and Andrew SkyPath 3.5GHz distribution system.

IPKOnet connects internationally through Microwave and fibre optics (via Albania to Montenegro and Slovenia - SIOL). While this main link is of E3 capacity, IPKOnet maintains a backup link via satellite.

IPKOnet offers dial up services as well. Currently, it has 6000 active dial-up accounts (some 20-30% usage of capacity) and 90 modems. Access on a monthly basis costs € 16.00.

Price per bandwidth, usually through wireless broadband connection (monthly fee):

64kbps (up to 128) = € 249.00 + VAT
128 kbps = € 390.00 + VAT
256 kbps = € 624.00 + VAT

IPKOnet is currently expanding its offering through a pilot residential broadband in one huge block of apartments in Prishtina. Monthly fee is €26.00 + VAT.

KujtEsa (www.kujtesa.com) is the biggest Internet service provider in Kosovo. It reports to have reached 80% coverage of the area of Kosovo. Virtually all other ISPs in Kosovo, except IPKOnet and DardaNet, are sub-ISPs of KujtEsa. Being the core ISP, it is unable to provide detailed information on its end users groups; however its direct customers comprise of sub-ISPs, banks, insurance companies and the Government as well as a small number of end customers such are Internet cafés. Customers are usually connected through a wireless broadband. KujtEsa is also leasing WAN capacity to its customers, mainly banks, insurance companies, as well as the Government.

It is the only ISP that has established links through all neighboring countries: Montenegro, Serbia, Albania and Macedonia. While its total actual Internet feed is 2x 34Mbps, the sheer capacity is as follows:

Montenegro	2xE3 + 2xE1 (Iskra 7GHz)
Serbia:	2xE3 + 2xE1 (Iskra 7GHz)
Macedonia:	1xE3
Albania:	10 Mbps

In view of the lacking Kosovo regulative and weak and for historical reasons frequently overtone discussions with the neighbors, KujtEsa was pioneering in direct agreements with its partners over the border. This is a distinct example of business agility in post-war Kosovo.

All other ISPs in Kosovo are sub-ISPs of KujtEsa or DardaNET. Currently, there is no exchange between the main ISPs in Kosovo (KujtEsa, IPKOnet and DardaNET).

UNMIK has established reliable connectivity with all main cities in Kosovo. Its network presents respectable capacity in Kosovo. IT connects all major cities with at least 34Mbps and it spans with at least 256kbps to very remote sites - wherever UNMIK has an office or any presence. The network is used for data communication and for remote UNMIK's telephone extensions. In view of the steady hand-over of responsibilities from UNMIK to PISG it is worth planning what use can be made of the currently UNMIK's network.

TV & Radio Transmission and Broadcast Services

TV penetration is high and, according to SOK, it reaches 105 to 100 households. Low quality cable TV is available in some parts of Prishtina. Due to historical reasons, there is a widespread usage of satellite TV services (analog and digital). By mid 2004 a first digital, satellite broadcasting is expected to be started by one of the TV stations.

The OSCE gave a high priority to the re-establishment of the terrestrial broadcasting system as the high costs of satellite

broadcasting prevented private broadcasters from reaching their audiences. On 15 December 2000, the Kosovo Terrestrial Transmission Network (KTTN) was formally inaugurated. The rebuilt network is the result of cooperation of the OSCE and KFOR with the Government of Japan and the USAID, who supported and invested in the reconstruction of the KTTN system.

The KTTN facilitates the transmission of Radio-TV Kosovo, the public broadcasting service of Kosovo. Hearings were conducted for the remaining Kosovo-wide television and radio frequencies for private stations to broadcast through the KTTN. As a result, Koha Television (KTV) and TV 21 were awarded Kosovo-wide television licenses, and Radio 21 and Radio Dukagjini received Kosovo-wide radio licenses. The stations are already broadcasting terrestrially[63].

Investments in ICT infrastructure

Major investments in the last two years in the telecomm sector were concentrated around PTK and improving of its infrastructure. The European Agency for Reconstruction has played an important role in the re-establishment of Kosovo's telecommunication services. On December 13, 2001, the European Agency for Reconstruction inaugurated a new transit and subscribers exchange in Prishtina, known as the "Illyria Switch". €4.4 million of EU funds went towards its construction. The "Illyria switch", Prishtina contract was awarded at the end of 2000 to a consortium of Siemens and DeTeLine Germany. Work began in August 2001 and finished in December. Technical supervision was done in the early period of the project by Telecom Austria and was finished by Management Partners Austria. The equipment and software installed is some of the most modern technology in telephone networking (The European Agency for Reconstruction in Kosovo, News bulletin, January 2002), (www.ear.eu.int/publications/news-a1b2v3.htm). There is no accurate data available on investments made by PTK itself.

The Kosovo Optical Ring is the major investment in ICT infrastructure in Kosovo. It will be funded by the PTK (approved by KTA). It will connect all major cities in Kosovo in a ring topology with a reliable and sufficient fibre optics infrastructure. The tender for the first batch: Prishtina-Mitrovica has been awarded and the work has started. This is a part of the first phase connecting approximately half of the cities within Kosovo and with Macedonia (Mitrovica - Prishtina - Gjilan - Ferizaj - Hani i Elezit - Skopje). It is not clear whether Serbia (Raska) will be connected with this phase or upon completion of the second phase, which connects Mitrovica - Pejë - Gjakovë - Prizren - Ferizaj and Prizren - Morinë - Albania.

3.4.7. SCG - MONTENEGRO

The principal service providers in the Montenegrin telecommunication market are:

- Telecom Montenegro, fixed line operator
- ProMonte, the first GSM mobile service provider
- Monet, the second GSM mobile service provider
- Internet Crna Gora, the first Internet provider
- MontSky, the second Internet provider

The state is owner of 51% of the shares in Telecom Montenegro and Monet and 15% of the shares in Internet Crna Gora.

The regulations for the fixed telephony have been passed, except for the regulation on interconnection, whose final version is expected in 2005. In the area of the mobile telephony, liberalization has already produced good effects, such as lower prices, the provision of new services and better coverage.

Mobile providers offer Data service (Internet) through the CSD and GPRS.

Internet providers offer Dial-Up, Leased Line, Wireless Success, and ADSL is in the preliminary phase. Internet access is enabled for all users covered by fix or mobile network, under the same conditions.

More than 120 great companies (state and private) have permanent on-line connection, and more then 4000 use Internet (Dial-Up). Almost every institutional organization has direct Internet access.

Academic network is realized on the areas of academic centers in Montenegro. They have direct link, direct Internet connection and direct connection with academic network of Serbia. Domain of Academic network is cg.ac.yu

Governmental agencies have their own permanent network. Domain of Governmental agencies network is mn.yu

Telecom Montenegro

The Investments in telecommunication infrastructure has brought Telecom Montenegro's system step towards to full digitalization and created conditions for providing wide range of high quality services. Residential: 169 700; Business: 20 166; Total number of lines: 189 865; Percent of digitalization: 92.5%; Number of employees: 1348; Number of subscribers (per 100 inhabitants): 28.8%. Total capacity of SDH network was 2.5 Gbps and 622 Mbps at the end of 2002. Installed fibre-optic network capacity further increased reaching a total capacity of 1231km cable.

At the end of 2002 in Podgorica was 39 switching loops installed at the local level. In addition, there are two international switches that have been working as a transit switches used for transition of traffic from the local switches that are placed in other Montenegrin municipalities.

Complete communication between switching capacities is organized by using solely fibre-optic cable that guarantees high quality communication. Fixed telephony has made great progress. Technical feasibilities have been improved, which resulted in tone dialing.

Telecom Montenegro provides data transmission via JUPAK (data transmission network) or leased lines. Since 1995,JUPAK Montenegro has been working as separate and unique data transmission network in Montenegro. JUPAK provides computers networking with up to 64kbpskbps speed. Nodes exist in all Montenegrin municipalities, as well as connection with Belgrade, so it is possible to make computers' networking that are placed out of Montenegro or out of the country. It is possible to make SVC (switched virtual connection) and PVC (permanent virtual connection). If users do not have communication equipment that supports X.25 protocol, they can make asynchrony connection by using internal PAD on Athena. It is also possible to access the JUPAK Network through dial-up connection. Three types of

[63] PISG, Ministry of Public Services (MPS) - Department of Information Technology (DIT), "E-Country Report", October 2002, www.kosovo.undp.org/devservices/E-Country%20Report.pdf.

modem are being used in JUPAK: Zyxel (for two-wire and four-wire access with transmission speed 19.2 kbps), Racal ComlinkVIII (for two-wire access with transmission speed 19.2 and 64 kbps) and Telindus Crocus (transmission speed 64 kbps). Telecom's obligation is to provide modems and theirs maintenance on both sides. Total capacity of the existing system is 590 ports from which 241 ports are in use. Network consists of 17 nodes.

Telecom has ISDN (Integrated Services Digital network) a digital network for integrated services as modern upgrade of the existing PSTN (Public Switched Telephone Network), which provides safe, fast and convenient communications to most users.

In March 2003, Telecom Montenegro started project, under the name MIPnet (Montenegrin IP Network) for implementation of new multi-service network for data transmission. "What is highway for transportation, that is MIPnet for information technology, but it's not just a highway, it's a highway of the future, with a countless lane".

MIPnet is multi-service network that can improve communication and business connections between different institutions, businesses and other segments of system.

The main goal of the activities covered by this project is realization of reliable, scalable IP network based on MPLS (Multi-protocol label switching) that will provide implementation of wide range of services such as: VPN (Intranet and Extranet), VoIP, Video on Demand, Remote Learning. Global Internet access would to be realized by two CISCO GSR 12406.

MIPNet network depending on an access type support different bandwidth ranges from 256 kbps to 10 Mbps per user.

The monopoly of Telecom of Montenegro in the market of fix telephony ended on December 31, 2003. The penetration is about 62 %. The sell of Telecom of Montenegro is expected to the end of this year.

Monet

Monet is a company with over 100 employees, around 167.000 subscribers and 22.3% penetration.

Monet signal covers about 97% of inhabited territory of Montenegro. There are 153 base stations, which cover all urban and suburban areas, main roads, and tourist centers, were activated.

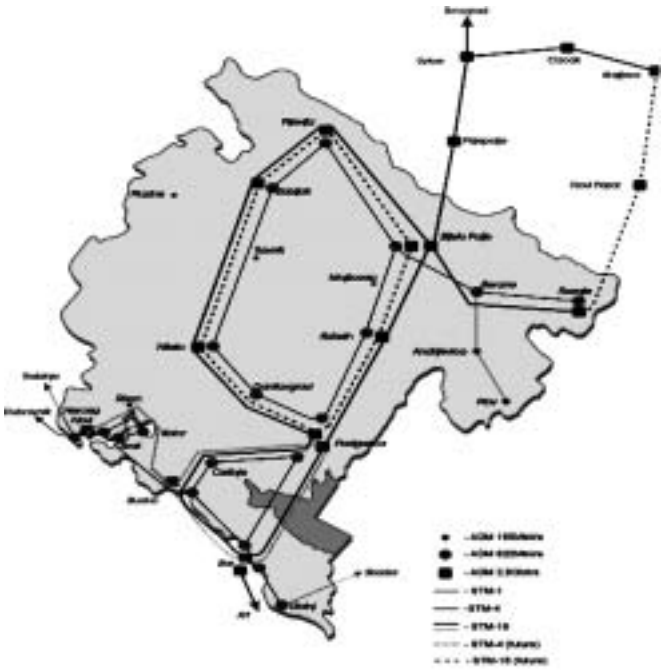
Internet Crna Gora (ICG)

Dial-up service is sold as a pre-paid service by the ICG business office in Podgorica, and by a developed dealer system in the remainder of Montenegro.

The dealers are often companies that sell computer equipment, and at the moment there are 17 of them on 16 sales outlets in Montenegro.

ICG has a unique access number on the territory of the entire Republic. Functioning of this number offers many benefits to the users since phone calls are paid at the local tariff, no matter which town of the Republic they are.

At the moment, Internet CG has 41.506 dial-up users with the intention of further increase (the growth in the first quarter of 2004 is 9.7%). Number of commercial users of leased lines exceeds a figure of 131 systems (the growth in the first quarter of 2004 is about 30%). The total number of Internet users increased for 11%, what is the result of advantage of credits for supplying of computers.



Approximately, almost 100 000 habitants of Montenegro use the Internet, implying that Internet penetration is at 15%. Awareness of the importance of the Internet for successful business grows in minds of our businessmen, so there are about 800 web presentations in their servers.

ICG has about 1590 active dial-up ports (the growth in the first quarter of 2004. is 15.2%). The number of lines enables connection in the first dialing, corresponds to the world standards (on every 30 users there is one access line). All access lines are completely (100%) ISDN ready.

In the first quarter of 2004, the total profit of dial-up services increased for 36%, total profit of selling of rental lines increased for 11%; total profit of web hosting services increased for 20%.

Special place in innovation projects of ICG belongs to PLC (Power Line Communication) technology that enables usage of the Internet through the grid (220V which every household has). Many people predict a great future for PLC, considering the fact that only one electric socket is needed for the Internet to come in many isolated places.

A special place innovation project also belongs to testing of ADSL (Asymmetric Digital Subscriber Line) technology. It is a test installation that currently functions in Internet CG, Telekom, and ten chosen locations in Podgorica and Cetinje. When new technologies are discussed, the existing infrastructure for Wireless network should be mentioned with respect to stable and favorable offers of broadband access.

ICG has been a sole financer of the peer-link to Belgrade. The ambition is to make peer connections with Banja Luka, Belgrade, Ljubljana, Zagreb, and Sarajevo.

The domain of Internet CG is cg.yu.

ProMonte

About 98% of the populated territory has been covered by the signal of this company, most of the tunnels, almost all beaches and ski tracks.

The number of subscriber amounted almost 300 000 and it's market share accounted for 61.5 %.

ProMonte Mobile Internet (PMI) is the service that connects mobile telephony and Internet and provides for the contents from Internet to be displayed in a special format on the display of your mobile phone.

MontSky

MontSky is a new Montenegrin Internet Service Provider. They have about 700 subscribers. The Internet connection is realized through the optical system with the speed of two Mbps. Their base is in Belgrade.

The domain of MontSky is montsky.net.

3.4.8. SCG - SERBIA

3.4.8.1. FIXED TELEPHONY

The Serbian company, "Telekom Srbija" a.d., is a joint stock telecommunications company. Telekom Srbija remains the only national provider of fixed telephony services. This company's monopoly on the entire communications system, with the exception of the Internet technologies, expires in June 2005. Such position is specified in the Law on Telecommunications (adopted in April 2003). Telecom Srbija is not obliged to provide quality of service, or adequate transparency of its operations. There are no obligations regarding fiscal responsibility on prices that the company is charging.

Since June 1997, 49% of this company has been owned by Telecom Italia (29%) and Greek OTE (20%). In February 2003, Telecom Serbia repurchased (bought-off) 29% of stocks from Italians operator OTE for 195 million Euros. After this, the stake of the Serbian government (Public Enterprise PTT Srbija) in Telekom Srbija increased to 80% at the beginning of 2003. Other 20% of stock belongs to OTE (Greece). There is still some controversy on the ownership issue, which will be resolved upon the decision of the International Arbitrary Court in Paris.

Despite the change in the ownership structure, Telekom Srbija did not impose any significant changes to its operations. There are some improvements in fixed telephony, with installations of digital switchboards in Belgrade and Nis. Replacing old technology is expected to reduce a huge number of party lines. The level of digitalization of fixed telephony is insufficient.

Landline operators in Serbia and Montenegro are connected regionally with optical backbone between most urban zones with fibre optic infrastructure: central node is in capital Belgrade, and other nodes are in Novi Sad (on the north), Nis (on the south-east), Kragujevac (central Serbia) and Podgorica- Montenegro (on the south).

Current situation in Serbia (February 2004) concerning the fixed network is the following:

- Total number of subscribers - 2.841. 325
- Number of installed lines - 2.415.676
- Number of connected subscribers per 100 people - 39,70 (Teledensity/fixed)

Information about business customers networks is the following for February 2004:

A) (ISDN - Integrated Services Digital Network)
- Number of installed users ISDN BRI (2B+D) 34.440
- Number of installed users ISDN PRI (30B+D) 1.961
- Number of connected users ISDN BRI (2B+D) 13.944
- Number of connected users ISDN PRI (30B+D) 650

B) Yugoslav public network for packet switching data transmission (YUPAK):
- Number of X.25 users 168
- Number of Frame Relay users 811

C) Internet backbone - network for providing standard Internet services. The network is connected with foreign ISPs (Internet Service Providers): C&W-SAD and SEA-BONE-Italy. Number of users wholesale 137

Although larger number of the population has good access to telephone services, what indicates telephone penetration which is 39,70 mainlines per 100 people and steadily growing number of landline user from 1.9 million in 1998 through 2.4 million in 2001, to 2,7 million in 2003. Still, a quarter of households in SCG dos not have a fixed telephone connection primarily due to the lack of technical conditions for installation (because of the underdevelopment of the infrastructure) and/or due to the high cost of installation (depending on the location, the cost of installing the telephone link range around one to two average monthly salaries). In relation to the territory covered by telephone connections, the situation in Montenegro is somewhat better than in Serbia, and considerably better in cities than in rural areas.

The quality of the signal is often inadequate, which is a problem of its own. Less than 4% of all calls processed fail (inspection result shows much more than 4% - results are not published yet). On the average, landline phone users need to try 3-10 times to establish a connection. This is fluctuating depending on the region or capacity of the local telephone switchboard.

Public phone booths, installed by Telecom Serbia, may be found in most parts of the community and are heavily used. A prerequisite for using the public telephone is a calling card, which can be purchased at newsstands or in the post offices. There are other public telephones in postal offices, where the user can pay with cash or check.

Charges in fixed telephony

Automatic telephone traffic includes calls made in LOCAL, NATIONAL LONG-DISTANCE and INTERNATIONAL.

A. Local traffic includes calls made within the local network and charges are the following:

- Pulse price: YUD 0.3644 for residential customers, YUD 0.6023 for business customer
- Monthly standing charges: YUD 48.00 for residential customers, YUD 46.07 for business customers
- Monthly standing charges for two-party lines: YUD 36.00 for residential customers, YUD 34.55 for business customers
- Connection fee: YUD 6,000.00 for residential customers, YUD 12,000.00 for business customers
- Telephone line relocation YUD 447.00

B. National Long-distance traffic is divided into 4 zones. The price of long distance call depends of the length of call, the time when the call is made (peak or off-peak time), the zone of the called subscriber.

- ZONE I 1 minute in peak traffic YUD 0,729
- ZONE II 1 minute in peak traffic YUD 1,458
- ZONE III 1 minute in peak traffic YUD 2,733
- ZONE IV 1 minute in peak traffic YUD 10,933 (includes telephone calls between subscribers in fixed and mobile networks)

C. International traffic is divided in 5 zones. The price of an international call depends on the length of a call and the zone of the called subscriber. The price in this case is the same irrespective of the time when that call is made. The price is different for residential and business customers.

- ZONE I 1 minute for residential customers YUD 16,86, for business customers YUD 27,86
- ZONE II 1minute for residential customers YUD 20,80, for business customers YUD 34.38
- ZONE III 1 minute for residential customers YUD 24,50, for business customers YUD 40,51
- ZONE IV 1 minute for residential customers YUD 44,56, for business customers YUD 73,60
- ZONE V 1 minute for residential customers YUD 53,46, for business customers YUD 88,36

Telekom Srbija" a.d. realized SMIN - (Serbian Multi-service Internet Network). That is a network of a kind of distributed telephone exchange similar to softswitch concept, which is primarily intended for Internet services but also for all other services such as voice transmission, data transmission and realization of virtual private networks. In regard to quality, unlike the existing Internet networks in Serbia, SMIN network is characterized by: high capacity.From inlet to outlet with SMIN network, the guaranteed bit rate is never less than 100 Mbps. high availability - international Internet connections are doubled including the routers, complete accessibility - the only Internet network which offers to all the customers on the entire territory of Serbia, Internet services under the same tariff conditions and immediately regardless of whether the Internet equipment exists in the place (on desired location) or not.

Within SMIN network, customers have, among other things the following new Internet services:

- Commuted access to SMIN for leasing the ports to Internet service providers-Virtual POP
- Direct access to Internet for international traffic.

Serbian multi-service Internet network (SMIN) has four PoP-s (Point-of-Presence): in Belgrade, Novi Sad, Niš and Kragujevac. PoP-s are interconnected by 155 Mbps links.

POP in Belgrade is connected by earth links the following foreign ISPs: C&W USA with the link of 10 Mbps and SEA-BONE-Italy with the link of 34 Mbps.

User access to Serbian multi-service Internet network (SMIN) can be established through:

- direct circuits of up to 100 Mbps
- YUPAK network
- Frame Relay protocol-access rate up to 2 Mbps
- ATM protocol - access rate up to 16 Mbps- X.25 protocol - access rate up to 64 kbps
- network of leased digital circuits Nx64kbps (N=1,...,31)
- PSTN/ISDN networks - commuted access through V.34, V.90, ISDN modem.

3.4.8.2. MOBILE TELEPHONY

Increase in number of mobile telephone subscribers is noticeable. The mobile telephony was introduced in 1996 at first trough the NMT systems. The GSM system was introduced in 1996 in Montenegro and in 1997 in Serbia. Mobile telephony is expanding rapidly and the number of users is constantly growing. One of the major reasons of the rapid growth of the mobile telephony is the fact that due to the undeveloped landline infrastructure, especially in the rural areas, the only connectivity option available is the mobile.

The data are the following:

- Number of subscribers: over 3 million (Serbia and Montenegro-prepaid and postpaid)
- Teledensity /mobile (Number of mobile telephone subscribers per 1000 people):
  Serbia 311.76
  Serbia + Montenegro 318.7
- Annual rate of growth of subscribers of mobile telephones: 50% (Source: Federal Statistic Bureau, 2002).

There are two operators, both subsidiaries of Telecom Serbia:

- Mobtel, the largest network in the country, wholly owned subsidiary of Telecom Serbia (100%) is currently in receivership. Number of subscribers in Mobtel, the largest network in the country has grown over the past five years from 50,000 in 1997 to 1,500,000 in 2002 to 1.700.000 in 2003.
- "Telekom Srbija" a.d. mobile telephony system -Telekom Srbija has developed its mobile telephony service called "Mobilna Telefonija Srbije". Under the GSM License Agreement concluded on 9 June 1997, the Government of the Republic of Serbia authorized the Joint Stock Telecommunications Company "Telekom Srbija" a.d., as a license holder, to establish, operate and provide public digital cellular mobile telephony services in the entire territory of the Republic of Serbia according to GSM standards. On 9 August 1997, the Federal Ministry of Telecommunications allocated to "Telekom Srbija" a.d. the frequencies for 900 MHz GSM system for the license period. Telecom 064 is a 49% subsidiary of Telecom Serbia.). The rates at MTS 064 are smaller than the rates of the Mobtel 063. Mobtel has a smaller number of subscribers- 1.700.000, but a better quality of service.

In February 2004:

- Coverage of Mobile Telephony of Serbia was 74%
- Population coverage was 93%
- Number of base stations 430
- Total number of Mobile Telephony of Serbia users in February 2004 was 1.857.715. (prepaid and postpaid).

These two mobile operators do not compete, but share market and actions between them.

The quality of the signal -mobile phone users need less than 3 trials to connection, except in the rush hour.

3.4.8.3. INTERNET ACCESS

Registration of user access to Internet.

- Registration of IP address
  Telekom Serbia a.d. allocates the user his IP addresses from the address space allocated to Telekom by RIPE NCC in keeping with the instructions of the Internet Activities Board (IAB). To apply for addresses for the first time it is necessary to fill in the ripe-283 form according to the ripe-284.txt instruction. (ftp://ftp.ripe.net/ripe/docs).

To apply for the extension of the address space it is necessary to fill in the ripe-267 form according to the ripe-277.txt instruction (ftp://ftp.ripe.net/ripe/docs). Together with the application form, the user has also to provide the network topology to support his application.

- Registration of the domain name.
  Telekom Srbija a.d. does not register the domain name. The domain registration in national yu domain is made with the yu domain administrators free of charge (http://www.nic.yu). Registration of other domains (.com, .net, ...) is made directly with the international organizations, for example, Networksolutions.com for a fee.
- Telekom Srbija a.d. provides only secondary DNS to its users.

Commuted access to SMIN (port lease to business customers - Virtual PoP)

Connection fee (per one port)

- Commuted access to SMIN for Internet and Audiotex providers : 1.200,00

Monthly fee (per one port)

- Commuted access to SMIN for Internet service providers (ISP) who offer prepaid services to their customers: 1.200,00.
- Commuted access to SMIN for Internet service providers (ISP) who offer postpaid services to their customers (and use tariff interval of 36s in the periods of peak and off-peak traffic) when the revenue from realized tph. Traffic is divided between Telekom and ISP according to the contract: ISP does not pay connection fee for the port.
- Commuted access to SMIN for Internet service providers (ISP) who offer postpaid services to their customers (and use tariff interval other than 36s in the periods of peak and off-peak traffic) when the revenue from realized tph. Traffic is divided between Telekom Srbija a.d. and ISP - according to the contract: 2.000,00.
- Commuted access to SMIN for Internet service providers (ISP) who offer postpaid services to their customers (and use tariff interval other than 36 s in the periods of peak and off-peak traffic) when the revenue from realized tph. Traffic belongs to ISP: 4.000,00.

Connection fee for direct access to Internet for international traffic is presented in the following table:

Digital bit rate	Creation of technical possibilities (access tax)	Installation tax	Connection fee
0	1	2	1+2
Up to 2 Mbps	27.500,00	1.500,00	29.000,00
From 4Mbps to 34 Mbps	518.500,00	1.500,00	520.000,00
100 Mbps ETHERNET	1.098.500,00	1.500,00	1.100.000,00

Monthly fee for lease of direct access to Internet is presented in the following table:

Digital bit rate	General access (GUP)	Selective access (SUP)	Peering with Telekom peering partners (PUP)	Access with traffic measurement (BIPS)
64 kbps	7.258,00	9.073,00	4.355,00	13.500,00
128 kbps	13.709,00	17.136,00	8.225,00	25.087,00
256 kbps	25.805,00	32.256,00	15.483,00	36.127,00
384 kbps	36.288,00	45.360,00	21.773,00	42.094,00
512 kbps	45.158,00	56.447,00	27.095,00	66.834,00
768 kbps	62.899,00	78.624,00	37.739,00	81.769,00
1024kbps	77.414,00	96.767,00	46.448,00	95.219,00
1536kbps	106.445,00	133.056,00	63.867,00	
2 Mbps	126.000,00	157.500,00	75.600,00	
4 Mbps	244.440,00	305.550,00	146.664,00	
6 Mbps	355.320,00	444.150,00	213.192,00	
8 Mbps	463.680,00	579.600,00	278.208,00	
10 Mbps	573.300,00	716.625,00	343.980,00	
12 Mbps	680.400,00	850.500,00	408.240,00	
14 Mbps	784.980,00	981.225,00	470.988,00	
16 Mbps	887.040,00	1.108.800,00	532.224,00	
18 Mbps	986.580,00	1.233.225,00	591.948,00	
20 Mbps	1.083.600,00	1.354.500,00	650.160,00	
22 Mbps	1.178.100,00	1.472.625,00	706.860,00	
24 Mbps	1.270.080,00	1.587.600,00	762.048,00	
26 Mbps	1.359.540,00	1.699.425,00	815.724,00	
28 Mbps	1.446.480,00	1.808.100,00	867.888,00	

Digital bit rate	General access (GUP)	Selective access (SUP)	Peering with Telekom peering partners (PUP)	Access with traffic measurement (BIPS)
30 Mbps	1.530.900,00	1.913.625,00	918.540,00	
34 Mbps	1.713.600,00	2.142.000,00	1.028.160,00	
44 Mbps	2.188.204,00	2.735.255,00	1.312.922,00	
54 Mbps	2.654.278,00	3.317.848,00	1.592.567,00	
64 Mbps	3.110.673,00	3.888.341,00	1.866.404,00	
74 Mbps	3.557.445,00	4.446.806,00	2.134.467,00	
84 Mbps	3.994.717,00	4.993.396,00	2.396.830,00	
94 Mbps	4.422.609,00	5.528.261,00	2.653.565,00	
100 Mbps	4.674.890,00	5.843.612,00	2.804.934,00	
104 Mbps	4.841.236,00	6.051.545,00	2.904.742,00	
114 Mbps	5.250.698,00	6.563.372,00	3.150.419,00	
124 Mbps	5.651.087,00	7.063.859,00	3.390.652,00	
134 Mbps	6.042.487,00	7.553.109,00	3.625.492,00	
144 Mbps	6.424.975,00	8.031.219,00	3.854.985,00	
155 Mbps	6.835.500,00	8.544.375,00	4.101.300,00	
10 Mbps Ethernet	573.300,00	716.625,00	343.980,00	
100 Mbps Ethernet	4.674.890,00	5.843.612,00	2.804.934,00	

Telekom Serbia is the sole provider of many of services required by the businesses, government institutions and civilians" such as telephones, leased lines, ISDN and especially the Internet connectivity with the providers abroad. Its monopolistic position is significantly contributing to the high service costs, limitation on the volume of subscribers and as a result is having a very poor development of the telecommunication sector countrywide. The monopoly of the Telecom Serbia is existing obstacle to growth of ISPs and upgrade of the network bandwidth. Cooperation between two telecom operators in Serbia and Montenegro is minimal.

Internet Availability

During 2000, Serbia and Montenegro had eight major Internet Service Providers and more than 40 local ISP subcontractors. By 2002 the number of Internet providers has risen to 60, the major two being Eunet (http://Eunet.yu), with a terrestrial link capacity of 34 Mbps and a satellite link capacity of 45 Mbps, and PTT Srbija Net (http://www.ptt.yu) with a capacity of 16 Mbps (through Baæeviæ, Lj.). A significant achievement for the development of the development of Internet services was the reduction of fees for leased lines four times in 2003. Thus most of Internet service providers operate via Telekom Srbija infrastructure. VeraT Net ISP has its own international access, via a wireless link to Hungary. The infrastructure developed by the Internet Service Providers is presenting an additional problem. Currently, only the major ISPs have established the mutual ISP-to-ISP connections (peering) - traffic exchange points at the domestic level. Therefore, the traffic between almost any two domestic ISPs usually travels through the international nodes. Although there are serious efforts to complete the task of interconnecting ISPs on the local level, it realistically should not be expected before the issues with the Telecom and ISP market settle.

Many ISPs offer to the end users the option to choose "full access" or "light access" --- full access being "the full access to all content on the Internet worldwide" and light access being "the access to domestic content only". As such, the light access option costs only 50% of the full access option (this is due to the fact that the international traffic costs ISPs significantly more than the domestic traffic).

The two largest operators:

- YUBC ISP 100% privately owned with 500 telephone lines
- Eunet with 2,000 telephone lines (Eunet is partially owned by the Government of Serbia (40%), and, as the Government is one of the major owners of the Telecom Serbia, it gave "priority" and privileges to Eunet to have access to the majority of ISP lines.

The complete international Internet connectivity for Serbia and Montenegro is outlined as follows:

- 5 x 34 Mbps (for a total of 170 Mbps)" through Telecom Serbia -4 Mbps through Telecom Montenegro with connectivity through Slovenia -14 Mbps satellite connection

The total connectivity available for the country: 188 Mbps

Major ISP providers in Serbia:

Telecom Serbia	2 x 34 Mbps
Eunet	34 Mbps through the Telecom Serbia
Yubc sistems	34 Mbps through the Telecom Serbia
Verat.net	34 Mbps through the Telecom Serbia
PTT Srbija Net	12 Mbps through the Telecom Serbia, in addition 4 MB satellite connection
SezamPro	4 Mbps satellite connection
BeoTelNet	2 Mbps through the Telecom Serbia; 3 MB satellite connection
MemoData	4 Mbps (2 Mbps through Verat.net and 2 Mbps through Telecom Serbia)
Bitsyu	3 Mbps satellite and 2 Mbps through Cg.yu
Cg.yu	4 Mbps through Slovenia

The above are the major ISPs in the country. All remaining ISPs not listed above are just sub-providers from the ones listed.

Majority of ISPs could grow much faster if they would have equal access to the telephone lines and/or leased lines. Thus, the growth of the ISP sector is dramatically slowed down by the monopoly of government enterprises.

This number of new dial-up connections is increasing literally on daily basis and the rising demand for connectivity cannot be satisfied.

Subscribers have some options between various Internet service packages. Also, there are more and more Internet Café establishments for people without access at home, school or work.

The leased lines necessary for the high speed permanent connections for ISPs and/or business are available only through the copper wires; the request for installation takes in average 6 months and is being provided only by the Telecom Serbia and/or Telecom Montenegro.

Telecom Serbia/Montenegro in some cases physically disconnect the copper wires to ISPs and business in order to maintain its connectivity monopoly. The reasons given to the disconnected competitors are elaborated through "technical difficulties", however, in some cases these "difficulties" last for several months.

This in particular has affected VoIP (Voice-over-IP) providers within the last 6 months" Telecom Serbia/Montenegro felt threatened that its voice (telephone) traffic will be significantly decreased with VoIP providers.

There is no definition within the telecommunications law covering VoIP operators; the lawsuits between ISPs and Telecom are underway.

Small progress was made within the last 6 months whereas some of the old analog switchboards were replaced by the digital ones, including a very few of DSL lines.

Costs for accessing and using Internet (Internet Affordability)

Our opinion: Internet access is priced within the rich of the majority of citizens. It is calculated by the hour for dial-up connections, and is doubled for ISDN access and leased lines. Two major ISPs offer flat rate pricing.

Dial-up connections are charged by the hour and the average price is $ 0.50 per hour (please reference Table 2.). There is a possibility to pay up front for the fixed amount of hours per month and rates are around $ 0.15, but the remaining hours (if any) are not being transferred to the following month.

Flat rates are charged around $ 50 per month and are worth its price only if a customer is spending more then 100 hours per month online.

With some providers it is possible to use 041 dial-up numbers (equivalent to 900 area codes in the US\Canada), thus the Internet connectivity is paid through the telephone bill only.

Charges for Internet connection

Prices in $ USD	10 hours	100 hours
PTT Serbia Net	Personal rate $ 4.1	Personal rate $ 30
	Business rate N/A	Business rate $ 30
Eunet	Personal rate $ 6.3	Personal rate $ 50.5
	Business rate $ 9.5	Business rate $ 77
Yubc system	Personal rate $ 5.4	Personal rate $ 42.5
	Business rate $ 8.3	Business rate $ 66.6
Verat.net	Personal rate $ 5.2	Personal rate $ 40.5
	Business rate $ 6.5	Business rate $ 50
BeoTelNet	Personal rate $ 4.5	Personal rate $ 33.3
	Business rate $ 6.4	Business rate $ 40

The tax is not included in the above pricing and it amounts to 20%.

ISDN connections are charged per hour also and the rates are 1.5 to 2 times higher then for the dial-up connections. The users are obligated to pay for the ISDN modems (hardware) and to pay a fixed monthly line rate to Telecom.

Leased lines are charged per used bandwidth and traffic. It sums up to $0.30 per Mb downloaded with the bandwidth of 16Kbps. There are options for larger bandwidth on monthly subscription terms where 33.6Kbps is $130, 64 Kbps is $520, 128 Kbps is $750 and 256 Kbps is around $1,350.

Wireless Internet access is available only in certain parts of Belgrade (the capital city) and is charged the same way as leased lines but with the possibility of having bandwidths between 1 and 2 Mbps.

An average company with 20 employees in Serbia and Montenegro pays usually $ 5,000 a month for 24-hour high-speed leased-line Internet connectivity.

Network Speed and Quality

Users have access to deal-up modem transfer speeds up to 32.2 kbps. Leased lines are available for business users and their transfer speed is up to 64.4 kbps. It is normally possible for users to establish a dial-up connection out of 5-10 tries. Several major ISPs have a standard of establishing the connection with less than 3 tries, except during the peak hours.

Dropped connections are frequent especially in non-urban communities. The quality of voice connection is acceptable but in the peak hours there are many echoing, double connections, and intermingling lines.

Problem lies also with network speed and quality, due to fusion of digital (7 numbers capacity) and prevailing analog (6 numbers capacity) telecommunication switchboards. Collision arises when interconnecting between them. Around 60-70% of domestic calls are successful.

However digitalization of Telecom Serbia's landline switchboards is slowly increasing ---- from 22% in '98, to 50% in 2001 and up to 53.2% in 2002. NOTE: it is literally impossible for companies to obtain an ISDN phone line.

Users can utilize the transfer rates between 33.6 and 56 kbps (large majority and of users" home and office) and 64/128/256 KBPS ISDN (small number of privileged users). Bandwidth intensive activities, such as large files or video files slow down the transfer speed or fault the mainline.

3.4.8.4. INFRASTRUCTURE OVERVIEW

1) The main issue in Serbia is monopoly and non-existence of free market.

2) The only solution to this issue would be to speed up the resolution of the ownership and legal issues within the telecom industry

3) At present, non-possession of telephone line cannot be viewed as the real obstacle for the use of Internet, since more than a half of the households have a telephone line, but do not have a computer.

3.5. DIGITAL DIVIDES

3.5.1. ALBANIA

Digital divide in Albania is conditioned by several phenomena:

- Majority of old individuals have inadequate technical education and lack knowledge of English language.
- Majority of individuals has low incomes, with salaries varying between 50-150 USD per month.
- Prices of many products are comparable or even higher than in developed countries.
- There are big differences between urban and rural areas.
- There are big differences between Tirana the capital and other cities.
- There are big differences in mentality of young and old people.

As result, there are multiple digital divides related with ICT:

- Urban versus rural areas.
- Tirana versus other cities.
- Young people versus old people.
- Technicians versus non-technicians.
- Majority of citizens cannot have home computers and Internet access.
- Majority of young people uses Internet cafes to access computers and Internet.
- Few people have possibilities to use Internet intensively when working in rich NGO-s, SME-s with high turnover, important public administration offices, and some technical academic institutions.

Low financial incomes and lack of infrastructure seem to be main obstacles. Two examples show clearly that in better conditions familiarity with ICT and the Internet would be much higher:

- There is a great number of home satellite TV receivers, which cost is two to three times less than a PC. The immediate impact is very high for people who grew up in a closed society.
- There is a high penetration of mobile telephony, 1 in 3 Albanians owns a mobile phone. The price of a mobile phone is much lower compared with a PC, while the use of prepaid cards permits people to control expenses of their daily use.
- During the census of 2001 some interesting data were collected regarding equipment of houses with TV sets and personal computers (the number of houses was evaluated at about 1 million):

Equipment	Average	Urban areas	Rural areas
TV sets 90%	95.1%	85.8%	
Satellite TV receivers	23.5%	23.1%	23.5%
Personal computers	1.4%	2.7%	0.3%

In Tirana there were counted personal computers in 4.6% of houses. In total there are about 14,000 home computers.

A better policy from Government would lead to lower prices for many ICT equipment, and it would lead to considerable decrease of digital divide between generations, cities and villages in low areas (villages in mountainous areas are in process of abandonment from population due to hard live conditions).

UNDP is running a Project that aims to create Public Internet Infrastructure in Local Government Offices and libraries- there are 14 PACs in the regions of Elbassan, Fier, Kukes, Gjirokaster, Shkodra and more will be established in Korcha, Diber, Lezha and some other 3 cities in 2004-2005.

3.5.2. BOSNIA AND HERZEGOVINA

The basic facts that can indicate the digital divides in BiH are as follows[64].

Access per type of households

Technology	Urban	Rural/Semi-Rural
Computers	10%	3%
Phone	99%	70-75%
Internet	11%	0.02%

Electronic Communication Usage per type of households

Penetration	Urban	Rural/Semi-Rural
TV	97%	89%
Satellite TV	19%	16%
Radio	65%	72%

Literacy distribution per type of households

Ed. Level	Urban	Rural/Semi-Rural
Higher Education	92%	8%
High School	78%	20%
Elementary	69%	31%
Illiterate Population	32%	68%

Utilities per type of households

Utilities	Urban	Rural/Semi-Rural
Electricity	99%	99%
Sewage System (S.S.)	77%	47%
Individual S.S.	17%	57%
Water System	96%	84%

Schools

There are no clear data on access in BiH schools. The situation can be indicated by one of the researches done on small but still representative sample (269 schools and faculties). The usage of computers is presented in the following table.

	Sample	Number of computers	Averages
Basic Schools	133	1289	9.69
High Schools	77	1258	16.34
Faculties	59	2248	38.10
Total	269	4795	17.83

The situation doesn't seem too bad, especially for higher education. But, there are some other factors. Average number of 10 computers per school does not look so good if we consider the usage of these computers - the most of them are actually used for administration and not for students. Also, the same research showed that out of these 4795 computers, only 434 are Pentium IV compatible or better. The research was made in 2003, so it means that schools are having only about 9% of really useful computers.

Place of access

The following table shows the distribution of physical place of access for those who use Internet.

At work	21,12 %
Home	32,14 %
At friend's place	14,68 %
Internet Café	17,60 %
School/faculty	11,42 %
Somewhere else	3,04 %
TOTAL	100 %

[64] Major sources: "Telecom 4 Development", UNDP Country Office Bosnia & Herzegovina and B@ISPA Association, 2003, and eReadiness Assessment Report, UNDP BiH, 2003.

Usage of Internet per type of institution

Type of institution	Sample	Yes	No	Don't know
Municipality	20	60,00%	30,00%	10,00%
Public Sector	129	58,91%	39,53%	1,55%
Schools	269	60,97%	39,03%	0,00%
NGO	8	75,00%	25,00%	0,00%
Business	158	72.70%	26.00%	1.30%

Local Content

The following table gives the answer on question, "Does your organization has its own web site?" The research was made in 2003.

Type of institution	Sample	Yes	No	Don't know
Municipality	20	40.00%	45.00%	15.00%
Public Sector	129	31.00%	62.00%	7.00%
Schools	269	28.62%	71,38%	0.00%
Business	158	51.90%	48,10%	0.00%

3.5.3. CROATIA

Internet Access and Internet usage (Source: GfK Croatia 2003)

	2002	2003
Internet Access (Population 10-74 years)	1.050.000	1.400.000
		39%
Internet Users	935.000	

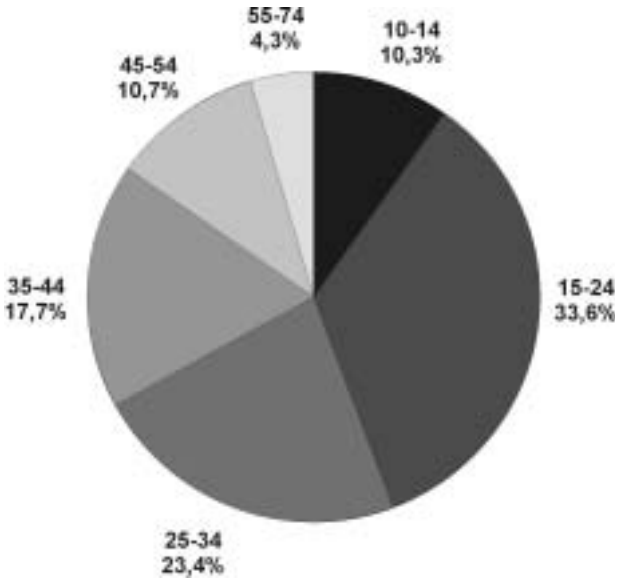
Internet Access and Usage by Households (Source: GfK Croatia 2003)

	2002	2003
Access to Internet from Household	19%	27%
Connection to Internet from Households		
Zagreb district		35%
Istria & Kvarner		32%
PC - in households	29%	37%
Zagreb district		48%
Istria & Kvarner		41%
Slavonia		29%
Lika, Kordun, Banovina		28%
PC owners by Household Income Category		Low - 7% Medium - 26%-40% High - 70%
Printers - in households	19%	25%
Households having Mobile Phone	69%	81%
Dalmatia		87%
Istria		86%
Zagreb		84%
Mobile Phone owners by Household Income Category		Medium - 90%-97% High - 100%

Distribution of Internet users (Source: GfK Croatia 2003)

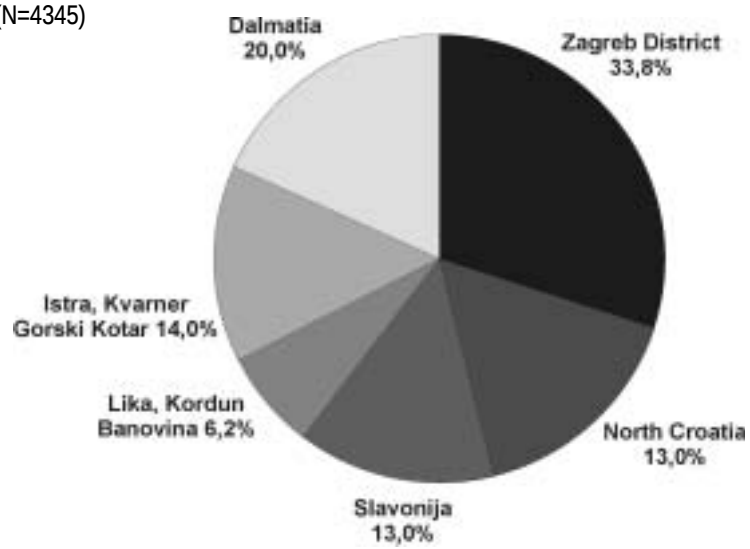
Distribution by...	Category	Percentage
Sex	Male	56 %
	Female	44 %
Age	15 - 24	34 %
	25 - 34	23%
	...	...
	55 - 74	4%

Internet users by age (N=4345)



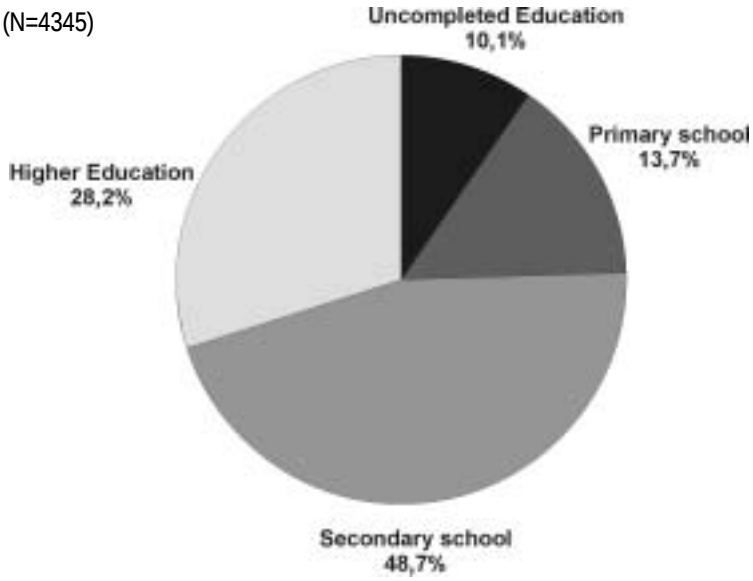
Distribution by...	Category	Percentage
Region	Zagreb district	34%
	Dalmacia	20%
	...	...
	Lika, Kordun i Banija	6%

Internet users by region (N=4345)



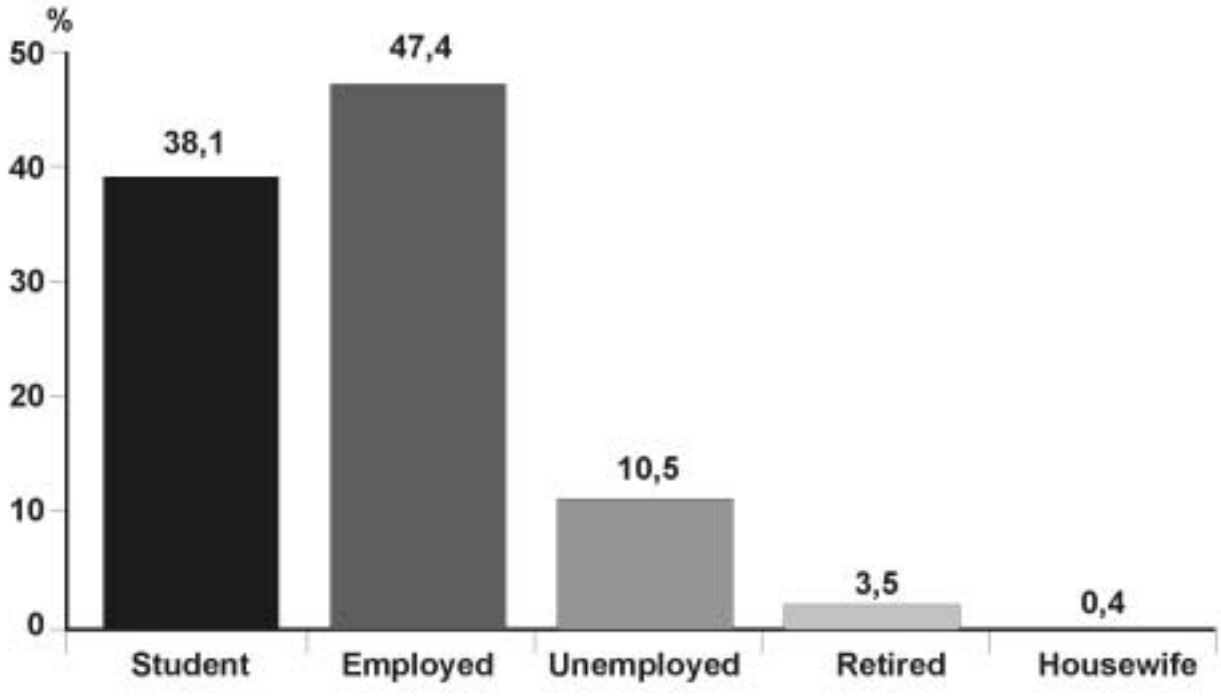
Distribution by...	Category	Percentage
Education	Secondary	48 %
	Higher	28 %

Internet users by education (N=4345)



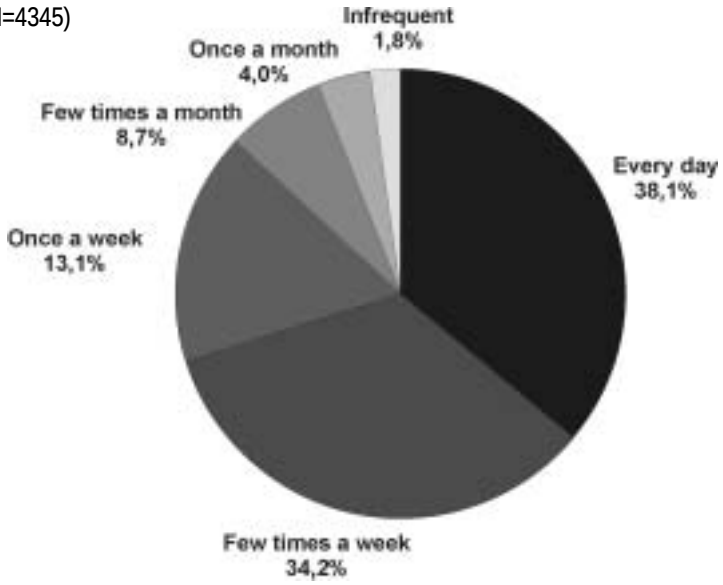
Distribution by...	Category	Percentage
Residence	Urban	77 %
	Rural	23 %
Statuss/occupation	Employee	4 %
	Student	38 %

Internet users by occupation (N=4345)



Distribution by...	Category	Percentage
Location	Home	78 %
	Workplace	25 %
Frequency	Daily	38 %
	Weekly	34 %
	Infrequent	2 %

Average Internet Access Frequency (N=4345)



Services and Purposes in Internet usage (Source: GfK Croatia 2003)

Main services of Internet usage:

- e-mail
- Information/News
- Business Information
- Information for school, faculty, education
- Music, MP3
- Journals/Magazines
- Entertainment
- Chat Sport - information/news

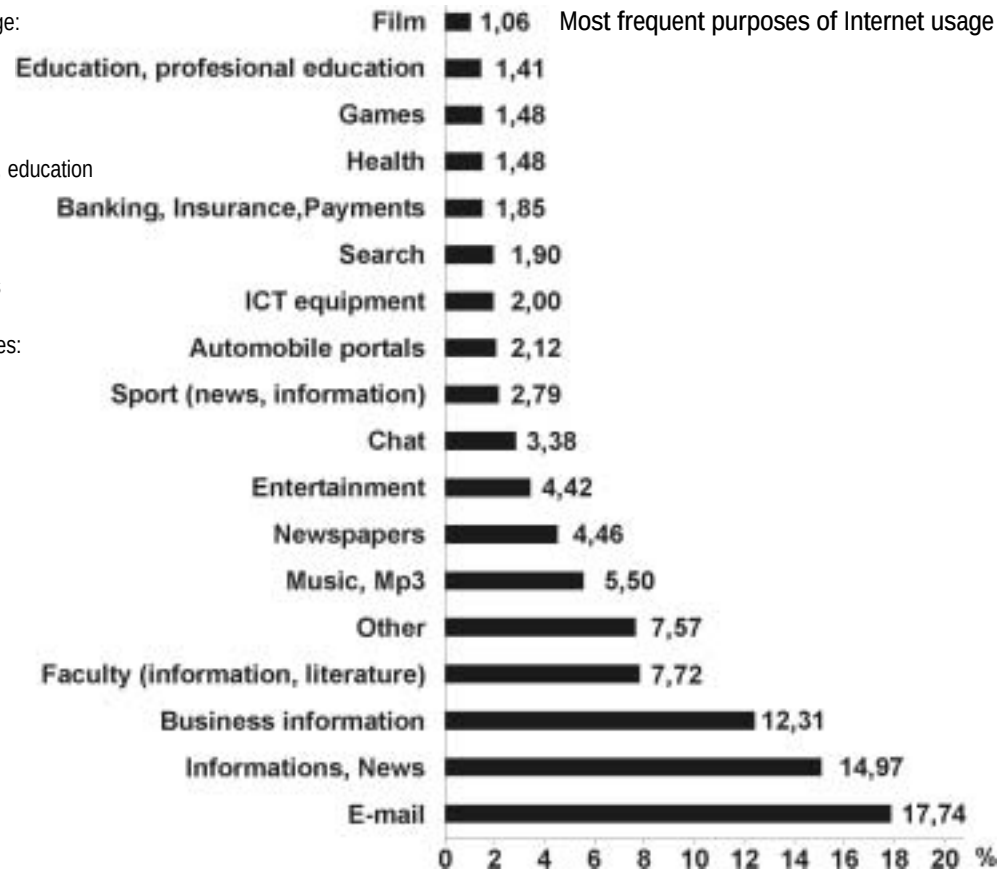
First 5 most popular web pages:

- www.iskon.hr
- www.google.com
- www.hinet.hr
- www.yahoo.com
- www.monitor.hr

First 5 ISPs by usage

- HTnet/Hinet
- Iskon
- Internet
- CARNet
- Vipnet
- Globalnet

Most frequent purposes of Internet usage



Individual users	2002	2003
Dial-up	233,601	295,119
Increase		26,33%
Broadband	105	642
Increase		511,69%
Total	233,706	295,761
Increase		26,55%
Business users	**2002**	**2003**
Dial-up	62,488	77,964
Increase		24,77%
Leased lines	994	1,249
Increase		25,62%
Broadband	1,435	3,741
Increase		160,64%
Total	64,917	82,954
Increase		27,78%
Individual and business	**2002**	**2003**
Dial-up	296,089	373,083
Increase		26,00%
Leased lines	994	1,249
Increase		25,62%
Broadband	1,540	4,383
Increase		184,57%
Total	298,624	378,715
Increase		26,82%

Source: IDC, 2003

Quarterly report by user type	2002	2003
Home	585,509	707,617
Increase		20,86%
Home only	240,059	318,428
Increase		32,65%
Business	234,590	313,855
Increase		33,79%
Academic	314,692	381,982
Increase		21,38%
Internet users Total	789,341	1,014,264
Increase		28,50%
Quarterly report by user type (%)	**2002**	**2003**
Home	74,2%	69,8%
Business	29,7%	30,9%
Academic	39,9%	37,7%

Source: IDC, 2003

3.5.4. MACEDONIA

The number of 9,24 computers in 100 citizens is very low, and what is even worse, this low number has an unequal distribution. Also, the quality measure of these computers is rather low - most of them are outdated Pentium 1, Pentium 2 models, and there is even a significant number of 486 type computers. These computers are mainly distributed within the frameworks of the state administration bodies, and their penetration in the homes is, still, on very low level. Also, they can be found mainly in the large cities, while in the provinces, small rural and underdeveloped places they have minor presence and usage. In addition, the Internet infrastructure is unequally distributed, so that while MTNet has Pop-s in every city, the rest of the ISPs have that only in Bitola, Veles, Gevgelija, Gostivar, Kavadarci, Kumanovo, Ohrid, Prilep, Skopje, Strumica, Tetovo and Stip.

The connections between POPs are mainly made through leased links of Macedonian Telecommunications.

The number of IP hosts is about 2,000. The technology used for Internet access is through dial-up (56Kbps/ISDN - BRA or PRA) and access through digital leased links of different speeds (64Kbps up to 2 Mbps).

Starting December 2003, Macedonian Telecommunications has offered ADSL on the market, but since this is done only through its subsidiary MTNet, the Telecommunication Directorate has initiated a procedure for offering this service to the users separately of the concrete ISP.

The Telecommunication Directorate has an approximate number of Internet users - 60.000 registered private entities and 8.200 legal entities. According to the estimates of the ISPs and the Telecommunication Directorate, there are around 120.000 Internet users in the Republic of Macedonia. This assessment includes the irregular users as well, who have an Internet access through the Internet cafes, from their jobs, etc. We can say that the penetration of the Internet in Macedonia is estimated 6%.

According to the last assessments by the Telecommunication Directorate, there are around 170.000 extra mail-addresses under "mk" domain.

The unequal coverage of the personal computers and Internet and their usage, is mostly a result of the economic situation of the citizens. Also, an unequal distribution exists within the different age groups. Namely, mostly due to the fact that because of the lack of knowledge of English language by the mature population in the country, and having no version in Macedonian of any single "proprietary" software product, mainly, people from 10 to 30 years of age posses IT skills and knowledge.

The problem facing Macedonian citizen is very well expressed in the conclusion that "... when the average Macedonian Internet user would pass the amount of time on Internet as the average American user, he would need to set aside one third of the average Macedonian salary".

3.5.5. MOLDOVA

3.5.5.1. Moldova

The digital divide did not avoid Moldova and is observed at such levels of relations as urban-rural, rich-poor, center-province, etc. Telecommunication infrastructure is concentrated mostly in urban areas. From the viewpoint of access to information and data networks, particularly to Internet, the digital divide is very big. The gap between telecommunication services offered in urban areas and the ones offered in rural areas is a problem of government concern. As you may see in the table below, Moldova must undertake special actions to avoid exclusion of the rural population from the society. Even when telecommunication networks are upgraded to ensure good quality of service to the entire population, there still will be a lot of work to insure free access to Internet to everybody.

IT expenditures are also concentrated in the capital city Chisinau, which is another confirmation to existence of a gap.

The same situation exists in what concerns allocations for informatization (96.7% in capital, tab.4.6), and supply of computers (app. 80% of computers are concentrated in Chisinau).

The same is true about information services (over 98% of them in Chisinau) and the total number of networks (81% are concentrated in Chisinau), Internet subscribers (over 95% in Chisinau) and the number of specialists. Of 40,342 of specialists, 32,453 operate in the capital.

Computers in a rural area are still an exception rather than a rule. They can be found only in a few schools or mayor's offices, owing to some international aids or grants from the UNDP or USAID. Almost none of the households in rural areas possess PCs, due to scarce financial resources and lack of understanding of the necessity to hold a rather expensive tool.

Percentage of steady Internet users is not very high; they can be found at their job places, where Internet services are paid by their employers, or in public places. Email service and visiting some news sites - these are the main Internet services accessed from households. A relatively high cost of dial-up connection (though it has dropped lately, and is now smaller than the cost of one minute of local telephone talks) is a substantial barrier for Internet home use.

Following are some tables showing some data on the existing divide in Moldova.

Access to cable TV - percent of households which have access to TV

Households which:	%
Use cable TV	30.9
Have access to cable TV	48.5
Don't have access	40.4

Fix and mobile telephony

Households which:	Yes (%)	No (%)	Don't know
Fix telephon	68.3	31.6	0.1
Mobile telephone	34.1	65.9	
At least one fix or mobile telephone	72.5	27.5	

Geographic criteria		Fix telephone	Mobile telephone	At least one fix or mobile telephone
	Urban	86.9	47.6	87.6
	Rural	52.5	22.7	59.7
Region	North	62.3	23.1	64.5
	Center	71.4	42.4	76.5
	South	68.7	25.3	73.6

Access to computer

of Population which uses computers		%
Sex	Male	24.7
	Female	22.2
Age	16 - 20	60.7
	20 - 30	39.0
	30 - 40	22.5
	40 - 50	12.9
	50 - 60	6.9
	60 - 74	1.5
Residence	Urban	36.8
	Rural	11.5
Region	North	15.8
	Center	29.0
	South	15.9
Type of activity	Public	28.3
	Private	29.7
	NGO	40.0
	Unemployed	18.2

Type of access to Internet		%
Total access to Internet		19.7
Total use the Internet		17.4
including :	Dail-Up	7.4
	SDN, ADSL	1.5
	Dedicated line	1.2
	satellite	0.2
	TV cable	0.2
	Other	0.3
	Don't know	6.6

Access to computer		%
Have access to computer		28,9
Don't have access to computer		71,1
Place of access		
	At home	6.8
	At friend's place	4.4
	School, University	7.0
	Workplace	8.1
	Public place (library, Internet-Cafe)	10.4
	Other place	0.2

Percentage of Population which uses computers		%
Sex		
	Male	24,7
	Female	22,2
Age		
	16 - 20	60.7
	20 - 30	39.0
	30 - 40	22.5
	40 - 50	12.9
	50 - 60	6.9
	60 - 74	1.5

Place of access to Internet		%
	At work	5.6
	At home	3.5
	At friend's place	3.2
	Internet-Cafe	10.1
	School/University	4.5
	Library	0.7
	Other place	0.3

Use Internet		17,4%
Sex		
	Male	24,7
	Female	22,2
Age		
	16 - 20	34.0
	20 - 30	35.3
	30 - 40	17.3
	40 - 50	8.7
	50 - 60	4.7
	60 - 74	-

Use Internet		17,4%
Residence	Urban	82.0
	Rural	18.0
Region		
	North	18.7
	Center	77.3
	South	4.0
Type of activity		
	Public	26.6
	Private	33.1
	NGO	1.4
	unemployed	38.8

All data is provided by the Business Consulting Institute, which held a number of serveys on the use on IT in Moldova.

3.5.6. SCG - KOSOVO

Economic preconditions

Since the end of hostilities in 1999, international community has invested enormous efforts to rebuild the infrastructure and develop human capacity to lead the process of growth and development. The development of local human capacity remains the major longer-term concern, in view of the UNMIK administration's inability to offer leadership and vision for sustained growth and development.

Five years after the end of hostilities, Kosovo holds back it's ranking among the poorest places in Europe, and adding up to the uncertain Kosovo's political status, it is the most isolated socio-economic and political region despite the enormous benevolent international presence.

The transfer of responsibility to Kosovan Government should help gradually to ease tensions that have emerged between UNMIK and the PISG resulting from a fragmented structure for policy formulation and implementation. Given the very recent establishment of the PISG, the capacity of many Kosovo institutions is weak. In some cases, lack of cooperation among the main political parties in Kosovo has also been reflected in a fragmented Government approach to issues.

On the Kosovo ground level, the digital divide can be asserted as if the gap is just emerging. Average incomes in Kosovo rebounded strongly after the cessation of hostilities, but yet, Kosovo remains the very poor area in Europe. Incomes are still well below pre-conflict levels at an estimated GDP $700 per capita and significantly below levels recorded in other post-conflict countries in the region.

In expectation of the latest poverty assessment we may cite the World Bank source: "Despite initial progress in reconstruction and economic recovery, poverty remains widespread." "In 2002, about 36 percent of the population of Kosovo was living below the poverty line of US$1.65 per adult per day. Many of these people, however, have incomes that are not significantly below the poverty line, with estimates indicating that consumption levels for the average poor person are only about 10 percent below the poverty line." "...While less common, extreme poverty remains an important problem. About 15 percent of the population lives below the extreme (food) poverty line of 2100 calories per adult per day." (Transitional Support Strategy for Kosovo - TSS, World Bank, March 2004)

Whereas there is no data available on the computer and Internet use among the particular poverty groups, a further field assessment as a part of comprehensive benchmarking system is necessary to uncover whether and to what extent computer and Internet use correlates to the poverty and within the different anticipated poverty groups such are rural households, female-headed households, minority groups as well as to its gender and regional dimension.

Data on computer usage relating to the age group between 15 and 24 years of age divulge that 28% of youth does not use computers among which the youth from rural areas comprise 63.3%. The main reason for not using computers is lack of access to computer (76%). (The Research on Youth in Kosova, December 2002)

Computer and Internet use amongst citizens

Regular assessments conducted by the independent public opinion, media and market research company Index Kosova, show consistent low patterns for computer and Internet use, as well as for computer possession rates and Internet access from home. Sample comprised of 1000-1500 random respondents. Daily use of computers among the Kosovan citizens varied in 5.1 - 7.0% while the Internet daily usage was 3.1 - 4.1% during the period Oct2002 - Nov2003.

Internet usage in Kosovo (source: Index Kosova)	October 2002	March 2003	July 2003	November 2003
Computer daily usage (%)	5.1	7.0	6.6	6.3
Internet daily usage (%)	3.1	4.1	3.2	3.5

Internet access

Citizens can get access to Internet at home, in their workplace and in public places. Computers are increasingly present in workplace environment in Kosovo. Internet access at work and in public places has a potential to prevail on a short run over the access from home which is restricted by factors such as available computer, infrastructure, level of income, training etc. The public sector, though without much coordination among the players, is investing continuously in ICT for administrative use purposes. Though the figures are hard to realize due to the large variation of our small assessment sample, it can be assumed that huge portion of around 80.000 civil servants men-force have the opportunity to access computers on a daily basis. At an increasing rate, Internet access is being provided to civil servants in all government structures including the municipality level.

Computers are equally advancing towards the private business workplace. Computer and Internet usage are progressively being considered as competitive advantages in a tight Kosovo market. Field research "ICT Country Status Report" (April 2004) shows that computers are used in the production processes in 83.6% of cases (D5BQ15), in finance 80.3% (D5BQ16), and in administrative purposes 77% (D5BQ17).

In public places, a breakthrough in computer and Internet access has been achieved through the explosion of the Internet café business. While there is no exact data on the number of Internet cafés, we can only estimate the growth through the increase on the demand for bandwidth by the main local ISPs. In six months (Sep 2003 - March 2004) the two main private ISPs in Kosovo, KujtEsa and IPKOnet, have increased their bandwidth from 18Mbps and 10Mbps to 2x34Mbps and 24Mbps respectively. The increase of (92-28) = 64Mbps can be correlated almost exclusively to the flourishing of the Internet café businesses. Considering that an average café consumes 128kbps and that ISPs have a bandwidth oversell ratio of at least 2:1, the increased bandwidth can be attributed to opening of more than (estimated) 1000 Internet cafés all around Kosovo. The increased competition has, in turn, lowered the prices therefore making the Internet usage costs range from as cheap as €0.30 per hour in the capital city Prishtina to at most €1.0 per hour at rural cities and villages.

The distribution of Internet cafés covers all main regions in Kosovo except small, hard to reach geographical pockets. Widespread of the cafés in rural areas is encouraging. Usage patterns in Internet cafés vary from electronic games through browsing to chatting and voice communication - VOIP. The average customers are mainly youth eager to explore the opportunities and to communicate with equally responsive peers' within the country or abroad.

Given the inexistent carrier network, the connectivity to the customers has been provided almost exclusively through the ISPs own-built wireless networks. These distribution networks are prone to quality constraints, such are occasional loss of connectivity, bandwidth may not be guaranteed at all times and, as their spread is driven by direct economic interest, they do not span in all the areas of Kosovo. Nevertheless, competition among the ISPs is continuously pushing forward the quality of services to a respectable level while the currently unregulated ISP market has achieved significant dropp of service prices in such a short period of time.

Without direct Government involvement, the interest for wider scale private investment in the ICT sector tends to follow a quick return and low risk schemes such as the GSM mobile telephony, thus leaving aside any prospect for investing in developpment of a carrier multi-service networks, UMTS, landline or broadband. As long as the country wide ICT development is not regarded as a priority by the Government, primarily by promoting, regulating and initiating development of the ICT sector in general, but also by providing incentives and social schemes for investment in the downside scale of the digital divide, the digital gap is likely to profile with a sharp increase in a limited, mostly urban areas while leaving other areas with relative basic, if at all, digital opportunities.

3.5.7. SCG - MONTENEGRO

Montenegro has relatively low level of using Internet and the reason is limited dispose of PCs and low level of economic strength of population.

The most manifested gap is the gap between the south and north region. For example, there is the same number of Internet users in Budva (city on the Adriatic Sea) and in three north municipalities: Pljavlja, Berane and Bijelo Polje.

Educational divide:

- elementary school population 19.07%,
- secondary school population 36.28%,
- high school population 13.87%,
- faculty degree population 27.09% and
- postgraduate 3.69%.

Age divide:

- less than 14 age 4.96%;
- 14-18 age 18.45%;
- 19-25 age 25.69%;
- 26-35 age 29.79%;
- 36-45 age 14.62% and
- more than 45 age 6.49%.

Percentage of using Internet for work is 58% and for fun is 42%.

There is about 40 000 registered households have dial-up connection and it's the penetration of 20%.

3.5.8. SCG - SERBIA

3.5.8.1. PC PENETRATION

Two basic assumptions for the use of Internet are telephone connection and possession of computer.

There are no reliable statistical data concerning the number of computers in SCG. It is estimated that at the beginning of 2002 households had at their disposal 435.000 computers. Nearly every seventh household in SCG had a computer, in Serbia nearly every sixth, in Montenegro every tenth. Out of the total number of computers owned by household 96% are in Serbia and 4% are in Montenegro. The ratio of the number of inhabitants and households to 1 computer is:

- SCG 19 inhabitants and 6,41 households,
- Serbia 18 inhabitants and 6,25 households,
- Montenegro 38 inhabitants and 10,1 households.

3.5.8.2. AFFORDABILITY OF PC- RELATION BETWEEN PC AND MONTHLY INCOME

The number of computers in households in SCG is in close correlation with the state of the economy of the republic and particular

regions, as well as with financial situation of households itself. Households with an income of 300 or more Euro possesses more than 50% of computers in Serbia, while households with an income of 100 or more Euro have a computer in only 2% of cases.

The basic results are indicating that in average every second household owning a PC is connected to the Internet (7.2% of the population). Such ratio is greatest in Belgrade where out of 3 computers in households 2 are connected to the Internet (19.3%).

Reason for such a small number of household Internet connections is related to many households having very old PC configurations (386 and 486). The utilization of PCs in households is mostly typewriting and/or for playing games, whereas the end user does not have a modem and/or software or does not know what would be necessary for a dial-up connection.

The number of households online in geographic segments

Households online (%)	Belgrade	Vojvodina	Serbia	Total
November 1999.	15,9	4,1	2,4	5,2
November 2000.	19,3	7,1	3,6	7,2

3.5.8.3. TELECOMMUNICATION DIVIDE - NO OF FIX LINES PER HOUSEHOLD

The market is limited by access problem. About 8000 telephone lines (nodes) are available for dial-up connections. The number is increasing rapidly but cannot meet the rising demand for connectivity. All major ISPs provide leased lines to business users. There are no free ISP services but the cost of Internet access is within the means of the majority of the urban population.

It is normally possible for users to establish a dial-up connection out of 5-10 tries. Several major ISPs have a standard of establishing the connection with less than 3 tries, except during the rush hour.

3.5.8.4. NUMBER OF INTERNET USERS

At the beginning of 1996 started the history of Internet in Yugoslavia by connecting Yugoslav Academic Network to the Internet through the provider BeoTelNet. At that time, Internet user population in Yugoslavia was confined to academic circles. Fist national provider operating on a commercial basis started to work in the same year making the Internet available for non-academic users as well. After the Internet was introduced in Serbia and Montenegro market in mid 1996, the number of people connected to the WEB grew at an average rate of 150% per year. At the end of 2000 about 5% of the population were using the Internet. At the beginning of 2002 there were over 600.000 users, constituting around 7% of the population. According to empirical study of Internet users in Serbia in 2003 in SCG were 640.000 Internet users, and Internet usage growth rate in the period 2000-2004 was 60,0% (BOS, 2004, pg 99). At least 51.8% of the population (urban population) is aware of the existence of the Internet. Accurate information is not available, but estimates suggest this percentage is from 60% to 80%. Growing numbers of community members use telecenters such as cyber-cafes and other businesses that offer computer use and online services to the public for a fee. Use of a computer in these locations for one hour costs approximately $ 1 US. Adding up the numbers of dial-up connection users at home, and those in cafes, at work and schools, we come to 20.000 people on line at any time during the day, which accounts for 0.3% of population.

Depending on the source used, Internet penetration data differ. Some sources show the following level of Internet availability:

- About 14 % of population has an access to web at work or at home,
- For about 85 % of population Internet is not accessible.

According to researches made by the marketing firm Masmi - the access to Internet at home use about 8,5%, at work 3,6%, and both at home and at work only 2,2% out of total SCG population. Some survey results from October 2001, made on sample of 1000 inhabitants from Belgrade, central Serbia, Vojvodina and Montenegro are also interesting. The results are as follows:

- 51% of users live in towns,
- 70% are under 34,
- 56,5% is male,
- 36% of users are from Belgrade, 29,8% from Central Serbia, 26,1% from Vojvodina and 8,1% from Montenegro.

There is digital divide between Internet usage in urban and rural areas. Internet is mostly used in cities than in villages (which is the consequence of the poor connectivity in rural areas), which means that almost 0.8% of urban population in Serbia and Montenegro is on-line at any given time during a day. The largest number of Internet users is in the capital city of Belgrade. Considering the fact that over two million Serbs are living worldwide, many people here buy computers in order to communicate with their relatives abroad.

Only recently with the support of local NGOs (Non Government Organizations) and international donors several rural locations has got computer classrooms where the use of computers and Internet is free of charge.

Geographic segmentation of online market in Serbia was done in the largest segments as follows:

- Belgrade
- Vojvodina
- Serbia

Concerning business sector users we can say that all major ISPs provide leased lines to businesses. Higher bandwidth solutions such as DSL or cable modem access are just starting to be developed and are offered by a handful of ISPs. There are no free ISP services. Some ISPs offer free hosting for private and public web sites and presentations. Average business in Serbia and Montenegro number 10-20 employees; in average such companies utilize 256 K -512 K bandwidth through the leased line connections. There are

approximately 40,000 of profitable companies in Serbia and Montenegro totaling in approximately 100,000 business users. Unfortunately, there is no option available for the businesses to have 1 MB or higher connections.

We can determine that the largest group of users is within 25 years of age with higher educational backgrounds. Men are more predominant Internet users and account for 60%, whereas women account for 40% of users in Serbia and Montenegro.

At present, there are 15,357 national domains (.yu) registered. This number does not include .com domain names.

3.5.8.5. LOCALLY RELEVANT CONTENT

There are more than 10,000 websites that are covering the local topics, most of which are hosted and created within the community, usually by the young people.

Many website provide contents on Serbian and about one third of them also provide content in English. Most of the people speak English having it learned through the regular education in the secondary schools and universities.

Most of the local web sites carry static content and they are not updated regularly. There are nevertheless some sites that are updating their content on the regularly basic (usually news sites), but most of such content is usually updated only once per year.

The feedback from the web page viewers in insufficient and there is a very small number of web sites with dynamic content, or where the user interaction is integrated.

There are several local web search engines (such as www.krstarica.com being on of the largest). The use of online bulletin boards (discussion forums) is rapidly growing, especially among the young people.

3.6. E-GOVERNANCE

3.6.1. ALBANIA

E-governance in Albania is in embryonic stage of development. The first metropolitan network in Albania was built in 1985 as a blend of academic and government network, but it was used very little from administration. During early nineties that metropolitan network was abandoned, and public administration was not interested in networking for a long time until late nineties when introduction of Internet stimulated development of local networks and requests for leased lines. When requests for data transmission re-emerged, telecommunication operators had difficulties to install requested lines and prices were astronomic.

In recent years interest for Internet services and creation of web sites increased in public administration, and these requests were fulfilled by private ISPs. But in majority of cases deployment of ICT were initiated by individuals more than by institutions. As result, from 17 ministries only 14 have web sites, 3 have only domain names, and there are 5 duplicated names resulting from changes in government and mobility of people. 12 ministries have web pages with some dynamic content, which is a first step towards use of networking to communicate with the public. Presidency, Parliament and Council of Ministers have also web sites. Nevertheless, Most government institutions use PCs mainly for text and data processing and for the exchange of files and messages between offices, while institutional information systems and institutional applications are not consolidated.

Few ministries have built good local ICT infrastructure. Funded by Italian Government, Ministry of Education and Science, Ministry of Finances, Ministry of Industry and Ministry of Economy have built local networks and installed several servers dedicated for basic network services. Ministries of Finances, Industry and Economy are connected with leased lines of 2 Mbps from Albtelecom and have joint Internet access. Ministry of Education and Science aided by World Bank has created a national low bandwidth network connecting local directorates of education and administrations of main schools and universities.

Within financial system, both Tax and Customs Directorates were more advanced for ICT deployment and had created institutional databases. During the Y2K campaign these two institutions were forced to change their hardware and applications. Ministry of Finances has two other projects, the first for informatization of treasury system and the second for improving internal audit in ministries.

Ministry of Education and Science is working to build up its information system, as well as implementation of electronic data exchanges between different directorates in Tirana and other cities. An important aspect in these developments is training of the staff for effective use of computers, telecommunication facilities and other equipment.

Ministry of Public Order has built a networked infrastructure used for processing of passports. Law Court of Tirana implemented recently an ICT based system for management of processes and communication with public. Some attempts are done to introduce ICT in offices of civil status.

From city halls, that of Tirana takes a special place. It has built a complete local network, is in process of creating institutional applications, and uses already ICT to process requests of the public (a special reception hall equipped with networked PCs is built for this purpose). Soros Foundation and World Bank funded City Hall of Tirana infrastructure.

Registry of population is not yet created, and Albania does not have an identity cards system (some people uses more than 20 years old identity cards, others use passports or certificates for identification). A partial work has been done already by the Institute of Social Insurance for the framework of building up the system of personal insurance numbers, but not terminated. Actually this institute is working in three directions:

- Implementation of personal pension numbers for all retired people;
- Control and transparency of pension related activities for the period after 1991;
- Creation of database with personal data of all retired people in Albania.

Central Commission of Elections in collaboration with local government institutions has periodically built lists of voters, but always with many errors. Only recently there are seen some preliminary concrete steps to start with issuing of personal IDs and preparation for issuing of identity cards.

An ICT based information system is implemented at Law Court of Tirana for management of documents and legal processes.

Major obstacles for better deployment of ICT in public administration include:

- Lack of dedicated budget for ICT, both for maintenance and for development
- Lack of specialized permanent staff
- Lack of institutional long-term plans and strategies

A Project that establishes a WAN for all line ministries in Tirana is now under consideration of the European Commission and UNDP and might be launched before end of summer

3.6.2. BOSNIA AND HERZEGOVINA

3.6.2.1. BIH PUBLIC GOVERNANCE STRUCTURES

There are 146 municipalities in Bosnia and Herzegovina, 10 cantons, 2 entities (Federation of Bosnia and Herzegovina - FBiH, and Republika Srpska - RS), District Brcko and state level government.

Such a complex structure produces various problems in terms of e-Governance development:

- There are 13 parliaments with power to define laws (sometimes contradictory to each other).
- Principles and practice of governance in one municipality (or canton), are often very different then in the other.
- There is low level of tendency making common databases or connecting the databases.
- There is almost no electronic communication, horizontally or vertically.
- There are no accepted standards related to software and hardware systems.
- There is no state level plan for informatization of state administration.
- Existing electronic governance support systems are not well connected and cannot give the reliable and timely information to citizens.

In short, there is no implemented e-Governance concept in Bosnia and Herzegovina.

3.6.2.2. GENERAL STATUS

Digital literacy of employees in governance structures.

About 45% of employees can use personal computer. BiH administration does not recognize ICT workplaces, such as "system administrator", "data security officer", "Web journalist", "Web administrator", e-tc. Institutions do not employ adequate specialists. Employees working on information systems development, implementation and maintenance are not well trained (only 5% information systems specialists with adequate qualifications).

Internet Access

According to The World Bank, Word Development Indicators (Washington, April 2003), out of 61 % of governance institutions that have access to Internet, only 4 % is connected by cable connection (2-11 mbps). Institutions are using services of almost 40 different ISP's. Government web pages are mostly just presentational with no real information useful to citizens. Also, they are not well updated.

Access points

There are no official places where citizens can find official, accurate and secure information on local economy, state administration, history, etc. Public institutions do not use the electronic media to transparently inform citizens on annual investment plans, procurement, budgets, etc.

According to Word Development Indicators (April 2003), Bosnia and Herzegovina is on the last place out of 60 examined countries regarding the quality of administration rules. Citizens are spending a lot of time to get relevant data from administration. The major interaction is between citizens and local government (about 80%). Managers are spending about 23% of their working time on these contacts.

Major obstacles

Major obstacles in introducing the concepts of e-Governance are:

- *Too many employees in administration.* In developed countries, one employee in local administration serves about 2000 citizens - in BiH, that number is about 350 (cantons Sarajevo and Orašje have the worst situation, one employee in local administration per 48 and 39 citizens, respectively). There is only 27.5% employees with higher education, and only 5,4% employees younger then 30 (about 44,7% employees are 40 to 50, and 22% are older then 50). Such structure tends to keep the status quo.
- *Administration is complicated and bureaucratic*, serving itself instead citizens, and acting non-responsibly to the public. In such environment, it is hard to implement new systems that are efficient and concentrated on citizens.
- *Lack of equipment and financial support*. This is chronic problem in all structures in country that had the war several years ago.

3.6.2.3. MAJOR DEVELOPMENT INITIATIVES AND PROJECTS

There are many initiatives and projects related to e-Governance development (customs administration, several municipalities have developed elements of information systems, there is more and more web portals offering at least basic information to citizens, entity governments are introducing usage of electronic databases etc.). However, two very important projects have been recently implemented and they will be presented in more details because of their strategic importance for Bosnia and Herzegovina.

CIPS - Citizen Identification Protection System.

The goal of the CIPS project was to develop and implement modern civil registers and common state identity documents. In the context of e-Governance development, it is the most important project that has been implemented in BiH since war. The civil registers and common state identity documents are sine qua non for any other development.

The CIPS project consists of two subprojects[66], the Civil Register databases located at the Network Operating Centre (NOC) in Sarajevo and the ID Card and Drivers License System (CCIS and CDLS). The latter is divided in two sub-systems, namely the Data Capture and Document Issuance solution for the CCIS and CDLS sub-systems, and the card technology and the personalization sub-system.

The Civil Registry is a web-based application. The data is stored in an Oracle database, which is located in Sarajevo and a standby database which is located in Banja Luka. The application is presented via

[66] Source: Digital ID Card Solution for Bosnia-Herzegovina, Siemens Business Services

the Internet Application Server 9i and accessed from the workstation with an Internet Browser.

The Data Capture and Document Issuance System serves both the CCIS and the CDLS. There is only one configuration of the workstations for both systems, and each workstation can perform the functions for both applications. The System Functions are: Biographic Data Capture, i.e. Photo-, Fingerprint- and Signature Capture, Issuance of Card, Viewing of Existing Database Records, Upload Statistics Information to the Central Database, Auditing and Reports and Stock Keeping for Card Materials.

The personalization of the ID card and Driving License is based on laser engraving technology that guarantees the requested demands on document security as well as a minimum of 10 years performance of a governmental ID card. The centralized personalization solution in Bosnia and Herzegovina is logistically connected to additional 146 decentralized data capturing and issuing sites. The card size is ID1 according to ICAO, Doc. 9303.

The CIPS project has developed the solutions for:

- End-to-end solution for issuing 2.5 million ID Cards and 1.5 million Drivers Licenses
- One Centralized Personalization Centre equipped with two Laser Engravers
- 2 central data bases (Network Operation Centers) - 1 central database and 1 central back-up
- A total of 146 district locations, consisting of Civil Registry Station, Live Data Capture Station (photograph, signature, fingerprint) and Issue Station
- A total of 20 Mobile Stations, consisting of a notebook-based Live Data Capture Station
- Live Fingerprint Capturing at time of Civil Registry Registration

In addition to its structural importance, CIPS project has produced the knowledge transfer and the increase in know-how. Software was developed by domestic companies (Ping, Optima). The CIPS team is mastering the technology and can be the core of future development teams for other projects.

Treasury information management system.[67]

The Public Sector Accounting Project in Bosnia and Herzegovina began in 1999 as a $4.8 million, two-year investment by USAID to automate the public treasuries of each "entity" government - Federation of Bosnia and Herzegovina and the Republika Srpska (RS). Neither thenational government (The State) nor any local governments were included in the initial work plan. After successfully achieving the primary goals of the original work plan, the project was expanded in scope by USAID to now include the national government and ten cantons (similar to counties).

This project has included all phases of accounting reform: consensus building and reorganization of treasury functions; development and installation of modern financial information management systems in each of the governments served; hardware and software acquisition; and training and staffing advice for implementing the systems. (The selected application software is a customized, local language version of Oracle Financials 11i with accounts payable, accounts receivable, general ledger, purchasing and cash management modules.)

The purpose of common software installed is also to integrate separated financial systems, should that objective become a priority. It can lead to existence of modern, transparent financial management systems, hopefully leading to budget reforms and self-sustaining long-term fiscal balance.

Project started in October 1999 and was finished in June 2004. The final project value was $13.8 million. It established the main offices in Sarajevo and Banja Luka. The Oracle Financial Applications 11i GL, AP, AR, PO, and CE on Linux SUSE 7 and Red Hat were installed. Total of 330 PCs, four servers, telecommunications lines and infrastructure, and many printers were installed.

The system started operating at the Federation and RS in January 2002; at the State level since April 2002; in 6 Cantons in 2003 and finally in other 4 Cantons by March 2004. Preparation included 4000 person/days of training.

The first results are already visible:

- FBiH avoided unbudgeted spending of 27 million km ($16.7 million) in 2002
- Tuzla Canton has reported first ever budget surplus of 13 million km ($8 million) for 2003
- By end of 2003, over 1.6 million transactions disbursing 4.6 billion km - all auditable.
- Sarajevo Canton has reported first ever budget surplus of 46 million Km ($28.4 million) for 2003

3.6.3. CROATIA

The main pillars of ICT infrastructure for e-Government are: Government Computer and Communication Network, National Smart Card Infrastructure, and Institutional infrastructure for e-Government technologies.

3.6.3.1. ICT INFRASTRUCTURE FOR E-GOVERNMENT

Government Computer and Communication Network

In the Request For Proposal, the following High-level CRO_GOV_NET functional requirements were specified:

- as a private Internet Protocol (IP) network shared by government agencies and other authorized users only CRO_GOV_NET will provide connectivity among users to a defined set of service delivery points.
- to provide commercial-grade voice communications capabilities within the network among specified users using the data network components and protocols. Voice services to be supported will include, but not be limited to, conferencing and multicast/broadcast.
- potential for video communications. Video services to be supported will include, but not be limited to, conferencing and multicast/broadcast.
- to support critical government functions and to be immune from malicious service and/or functional disruptions to which the shared public networks are vulnerable (i.e., so-called cyber attacks). In particular, it shall be impossible for malicious or intentionally disruptive activities (e.g., denial of service attacks) to be perpetrated within CRO_GOV_NET from any network external to CRO_GOV_NET. Similarly, it shall be impossible for malicious code (e.g., computer viruses) to penetrate CRO_GOV_NET from any network external to CRO_GOV_NET.
- to provide the highest levels of reliability and availability including trunk and access diversity, and rapid response times for customer outages.
- traffic will be secure (i.e., encrypted by the network using approved encryption techniques), and suitable for carrying classified information.
- it will be a turnkey solution offered and priced as a service to

[67] Major sources: Rudy F. Runko, Public Sector Accounting Reform in Bosnia and Herzegovina, IPA - Institute for Public Administration, NY, 2002; Deloitte Touche Tohmatsu, USAID Bosnia and Herzegovina Public Sector Accounting Project Report, 2004.

participating users.
- it will offer bandwidth-on-demand services at user locations and will be scalable to meet growth in overall network demand and/or peak requirements.
- all components and links must be located in the Republic of Croatia.
- to maintain Internet technologies5 with state of the art commercial services to the maximum extent practical.
- CRO_GOV_NET to be operated on a 24/7 basis by the contractor.
- CRO_GOV_NET to provide initial operational capabilities (IOC) within six months from contract award. IOC is defined as full CRO_GOV_NET IP connectivity to all locations. Multimedia, www.w3.org

Negotiating process throughout 2002/2003 resulted with the final proposal. Government of Croatia did not make its final decision on HT submitted proposal in the year 2003.

National Smart Card Initiative

Based on the individual requirements of: State and Public Finance Information System (budget beneficiaries, tax payers), National Healthcare Information System (Health Insurance Card), Advanced Digital Signature Infrastructure, New Personal Identity Card, Social Security Card, and almost all e-government services, as well as EU and International Standards for Interoperability of Smart Cards, Government initiative to implement National Multifunctional Smart Card as the infrastructure for e-Government has been taken in 2003.

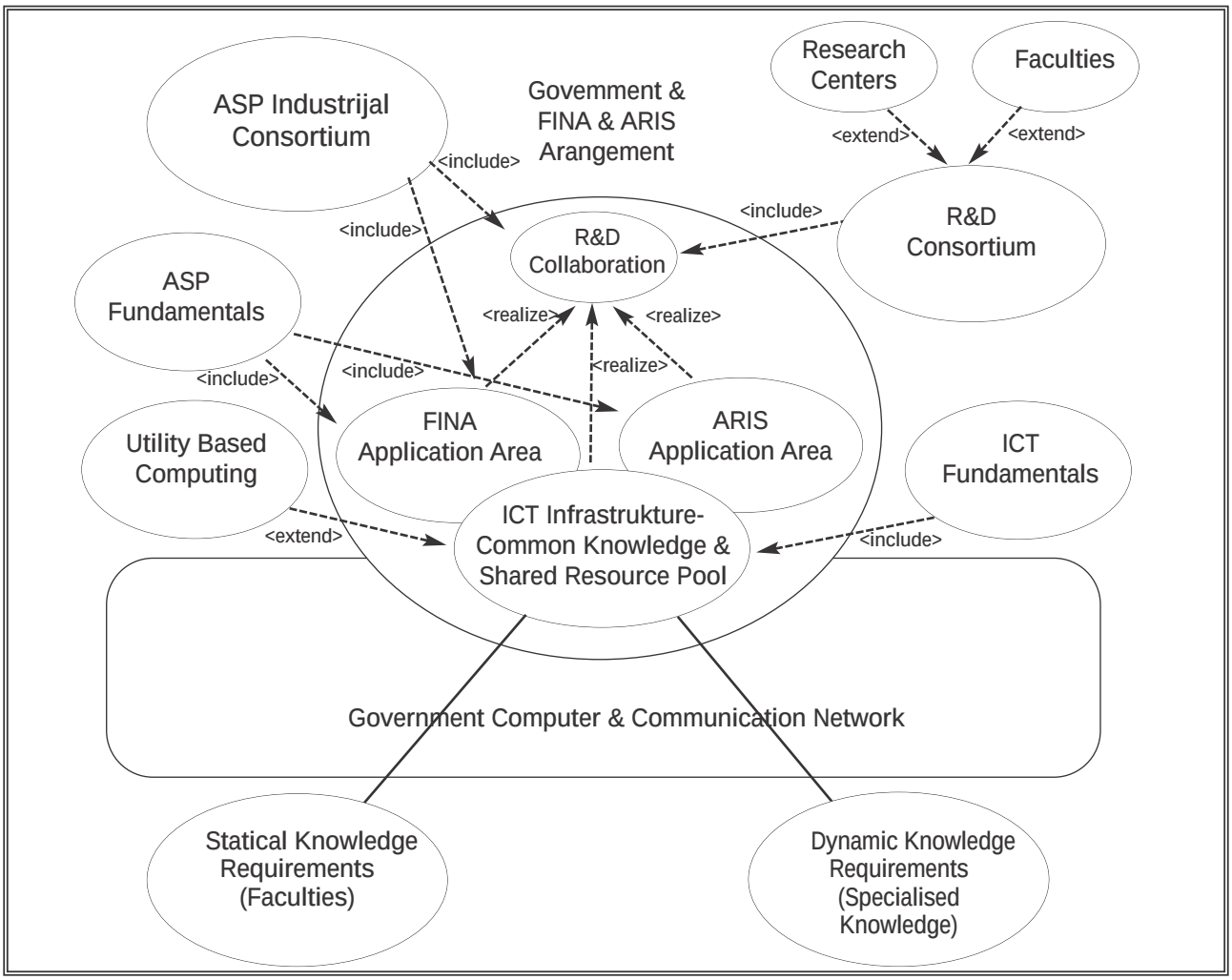
Institutional Infrastructure for e- Government

Considering high-level functional requirements, emerging Internet service technologies and service models, basic and advanced requirements for e-Government, Sectorial Government Implementation Projects and Project Interoperability Requirements; Considering Human Professional ICT Resources, given and required Intellectual Potential and Knowledge Management Requirements; Considering Strategic, Tactical, Operational ICT Management Requirements, Considering Constrained ICT Financial Resources; Based on Multilevel Institutional Interoperability Model, Institutional Implementation framework has been designed.

FINA is contracted to act as the Application Service Provider (ASP) for e-Government Web and emerging Government GRID services, in the following areas:

- ASP in Application Management
- ASP in Data Management
- ASP in Infrastructure Management
- ASP in Security Management
- ASP in Service Management
- ASP in Storage Management

Institutional Interoperability Model is presented in the following illustration[68].



[68] Universal Access, Semantic Web, Trust, Interoperability, Evolvability, Decentralization, Cooler Multimedia, www.w3.org

Government Policy and Management is implemented through government representatives in the Supervisory Board of Financial Agency. Project owners (ministries, government institutes, agencies: on the national, regional and local levels) are beneficiaries of FINA ASP's.

1.1.3.2. COMMON E-GOVERNMENT POLICY AND PROJECTS

State/public finance and budgeting

Basic characteristics of state and public finance and budgeting implemented or prepared to implement by end 2003 and on are presented as follows:

- Program based Budget planning, preparation and monitoring. Programs are determined by long-term development strategies, special laws, and regulations enacted on the basis of law. A financial plan proposal by programs has to show revenues and receipts from which the proposed programs will be financed, by types, and expenditures and outlays foreseen for a three-year period, in accordance with budgetary classifications (organizational, economic, functional, program, and location).

The implementation of the SAP system within the State Treasury, on the one hand, and the establishment of a Single Treasury Account with the Croatian National Bank, on the other, have simplified for the central State Treasury the execution of the government budget and have led to improvements in government revenue collection, payment execution, supervision and control of monies of budget beneficiaries.

- Revenue Services Information System. Strong pressure of state finance system reform, and Government stated ICT standards and corresponding alignments have forced the reengineering requirements of Revenue Information System.
- Customs Administration Information System. The Information system of the Croatian Customs Administration (CA) has been created as an integral system providing support to all the segments of the CA operations. It encompasses tools, i.e. services, for carrying out customs procedures and other accompanying activities within the CA's scope.

Customs operations, acceptance of data in electronic format, the need for their availability in various processes in very short time spans and at geographically widely scattered locations, have resulted in the organization of the CA information system that has been currently applied.

The logical controls that are used for processing customs declarations contain the installed provisions of the Customs Act, the Regulation on the Implementation of the Customs Act, the Ordinance on the Forms for the Implementation of the Customs Act, the Customs Tariff Act, the Regulation on Customs Tariffs, the Trade Act, the Value Added Tax Act, the Excise Duties Act, the Stabilization and Association Agreement, the Free Trade Agreements that the Republic of Croatia has signed with other countries, and other regulations. Smart Card driven usage of CA Information System is under preparation.

e-GIF

Having stated the requirements for alignment of ICT by International Standards, Government Steering Committee for Internet Infrastructure Development has decided to relay and implement Electronic Government Interoperability Framework (e-GIF) of Great Britain's Office of eEnvoy.

Government Office for the Internet Infrastructure Development imposed the implementation of international ICT standards as a condition in any ICT related tender documentation.

e-Procurement, Software Licensing

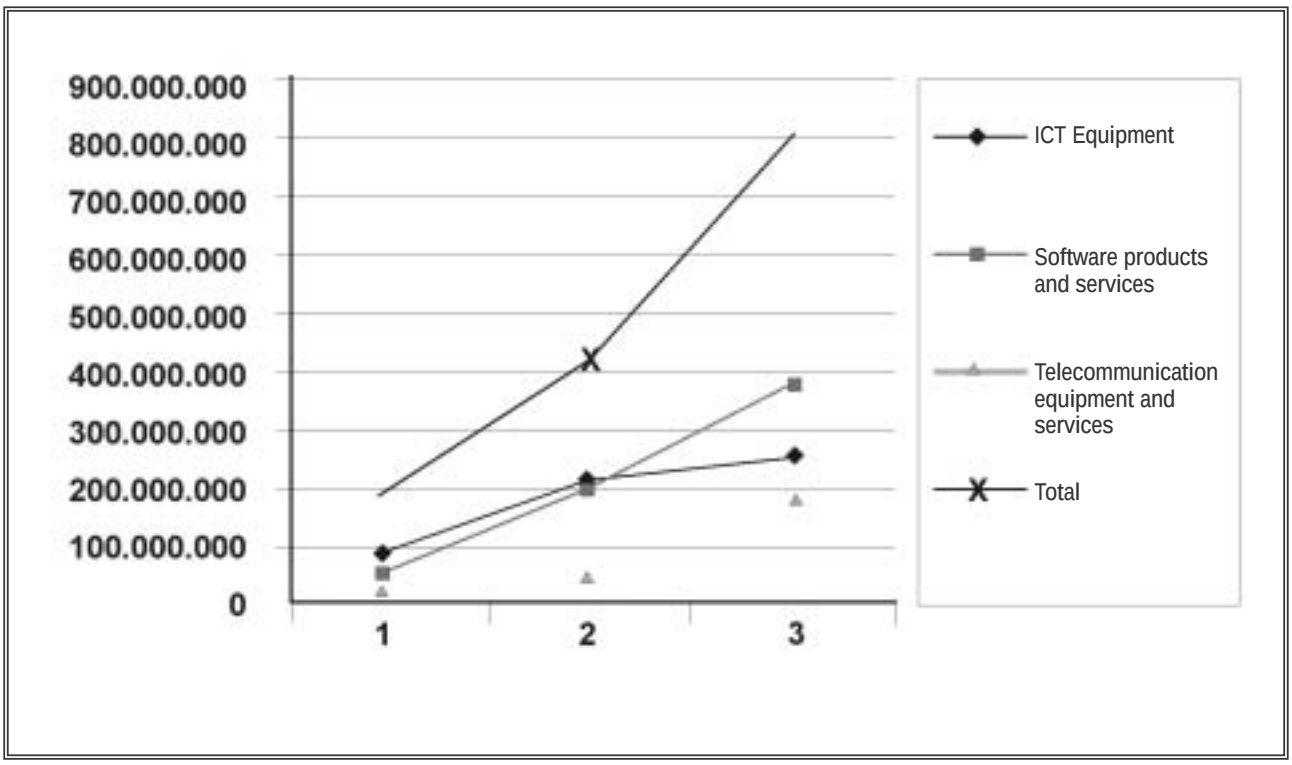
Office for the Internet infrastructure development has started syndicated public procurements of ICT for all ministries and government institutes/agencies. Office has implemented e-Procurement Portal, technology to obtain to all government stakeholders to interact through the procurement processes.

Due to volume of scale, transparency and open market competition, significant savings through price drops were obtained.

Strong political commitment of the Government followed by evident increase in budget for ICT procurement for the years 2001-2003, is presented in following data:

Government procurement of ICT Equipment (kn):

	2001	2002	2003	Sum:
ICT Equipment	92.040.167	206.660.022	251.836.810	550.536.999
Software products and services	58.020.650	187.334.014	361.570.888	606.925.552
Telecommunication equipment and services	17.522.459	21.321.031	181.550.546	220.394.036
Total	167.583.276	415.315.067	794.958.244	1.377.856.587



VPN based e- Government Portal

The VPN based e-government portal (ePortal) required the migration from a paper-based to a digital administrative infrastructure. For that to happen, a regulation was introduced to provide equal validity for both digital and standard signatures. The VPN data network was built to connect all government organizations to provide support for the exchange of electronic data and documents, and ePortal was implemented in December 2001.

The e-government portal establishes communications at the G2G level, increasing efficiency and productivity for government members and support staff within the executive and the ministries, and other governmental bodies. Politicians and employees can find, share and publish information, effectively use existing information and understand data according to individual needs.

More functionality to the portal has been added, starting from contextual search on discussions from past sessions, consulting articles of specific laws and the constitution, ending by navigation through budgetary performance over time. Interoperability of Government Office Management System (Document Management System, Workflow Management System, Knowledge Management System), based on Ordinance for Office Administration in the Government, and ePortal is implemented by Web Services support.

ASP implementation of ePortal, projected to serve national, regional and local government requirements, is planned for implementation over e-Government ICT infrastructure.

VPN based e-Parliament Portal

Developed and improved on the experience of government's ePortal, tested and prepared for the full implementation in 2003.

3.6.3.3. E-GOVERNMENT SERVICES

Two base components are presented: government services to citizens and business (G2C,G2B) and organizational transformations of the government (G2G).

G2G

Implemented G2G Services:

TRANSACTIONAL

- Treasury (SAP R/3 Treasury Functionality)
- Government owned Properties

COLABORATIVE OFFICE SYSTEMS

- ePortal

Implemented Pilot Projects:

- Intranet Payroll System (transactional, dimensional reporting (OLAP))

G2C

The first-generation government Internet presence, characterized by a proliferation of individual departmental web sites each with a separate URL, offering its own department information and on-line services, has ended. The re-engineering of Information Services (Internet Web Pages and Content Management) - mainly started in the years 2002-2003.

ICT infrastructure for e-Government (4.4.1.) is pre-condition for Context related Information Services implementations.

Government Transaction Services - ongoing internal developments and implementation as a prerequisite for citizen centric implementations for the target year 2005.

e-Citizen

- Comprehensive e-Citizen developments were planned to start in 2004.

e-MuniS

One of E-MuniS main objective is the enhancement of the quality of life of the citizens through better and more accessible services provided by local administrations.

"Rijeka Online"

Internet portal with information about the City, the City Administration and some services. Portal is build using "iSite" dynamic Web content management system, where Municipality administrative clerks are publishing content without intervention of professional IT staff, solving problem of "webmaster bottleneck".

Second phase, includes implementation of "eBoard" solution of preparing and executing City government and City council session based on electronic documents and Internet technologies, which will allow "paperless" sessions and integration into a Document Management System supporting document preparation from all Municipality Departments.

"You Are Rijeka"

Portal of communal services, performed by communal companies owned by City, has been developed, providing common invoicing for all services except electricity.

G2B

TRANSACTIONAL

- Custom administration
- Commercial Court Register
- Set of Financial Registers (FINA)

Information Services (Internet Web Pages and Content Management) - mainly implemented in the years 2001-2003.

Government Transaction Services - ongoing internal developments and implementation as a prerequisite for citizen centric implementations for the target year 2005.

G2E

Payroll - pilot implementation in 2003 Human Resource Management (HRM) - Internet Enabled Employee

Administration component - pilot implementation for the Government in 2002.

Knowledge Management System (KMS) - partially implemented in 2003 within the ePortal solution.

3.6.3.4. COURT, JUSTICE AND HOME AFFAIRS

Integrated Court Management Information System

Component of National Strategy for Legal an Court Reform, strengthened by:

- Recommendation Rec(2001)2 of the Committee of Ministers to member states concerning the design and re-design of court systems and legal information systems in a cost-effective manner, and
- Recommendation Rec(2001)3 of the Committee of Ministers to member states on the delivery of court and other legal services to the citizen through the use of new technologies,

Requirements Specification, Conceptual Design and Elaborated Feasibility Study for e-Court Implementation, as well as Implementation Scenario have been finished by the end of 2003.

Real Property Registration and Cadastre Project

The project involves the following four components: Component A - Real Property Registration System Development; Component B - Cadastre System Development; Component C - Inter-institutional Operations and Information Technology; Component D - Project Management, Legal and Policy Development.

The objective of the proposed project is to build an efficient land administration system with the purpose of contributing to the development of efficient real property markets. This will be achieved by addressing aspects of the supporting infrastructure, especially the real property registration system in the municipal courts, the cadastre system that is operated by the State Geodetic Administration SGA) at the regional and branch office levels, the academic institutions and the private sector support professionals.

Municipal Court Improvement Project

The Municipal Court Improvement Project is designed to set up a model and to assist in the reform of courts and justice system in Croatia. The project will focus initially on the Zagreb Municipal Court. The objectives of the Project are: increase efficiency in the administration and disposition of civil and criminal cases;

- improve the quality and timelines of judicial decision-making by
- strengthening the capabilities of judges, in particular municipal court judges, to better manage the process of adjudicating cases;
- assist in formulating and implementing reforms in the structure or operations of the court system.

Digital Company Register

Commercial Court's Digital Company Register in place.

Court and Bankruptcy Administration Project

Court and Bankruptcy Administration Project is designed to assist advancing insolvency proceedings by modernization of selected commercial courts and increasing professionalism and competence of judges and bankruptcy trustees.

Information system for electronic data processing in the Ministry of the Interior

Improvement and technological innovations of the Croatian Ministry of the Interior information system was in place. Information system consists of the following sub-systems:

- the subsystem of the service of search includes the register of wanted lists and proclamations for persons, the register of stolen and missing objects and the daily operative bulletin of events;
- the subsystem of crime includes the register that refers to criminal acts and their perpetrators; for example: an alphabetic register, the register of nicknames, the register of former names and false personal names, the register of personal description, the register of perpetrators of criminal acts, a collection of fingerprints, etc.;
- the subsystem of foreigners affairs includes the register of foreigners whose prolonged stay has been granted, the register of refugees, the register of foreigners' reported temporary residence, the register of issued identity cards for foreigners, the register of travel documents and visas issued to foreigners, the register of lost travel and other documents issued to foreigners, etc.;
- the subsystem of traffic includes the register of motor vehicles and caravan vehicles, as well as their owners, the register of traffic accidents, the register of penalties and measures undertaken in traffic;
- the subsystem of weapons affairs includes the register relating to supply, keeping and carrying weapons and ammunition;
- the subsystem of fire fighting includes the register on fires and explosions;

- the subsystem of administrative affairs includes the register of citizens' assigned personal identification numbers, the register of reported temporary and permanent residence in the Republic of Croatia, the register of identity cards, dismissals and refutations of nationality, the register of travel documents, the register of territorial units, the register of persons accepted as Croatian nationals, the register of corporate entities, etc.;
- the subsystem of human resources;
- the subsystem of the material and financial affairs defines material and financial affairs of the Ministry of the Interior of the Republic of Croatia;
- the subsystem of operative-statistic reporting enables the beneficiaries of the subsystem to direct the work of the service on the basis of gathered information;
- the subsystem of the border-related affairs produces information on numerical indicators of passenger and vehicle traffic, documents, daily operative border bulletin, operative-statistic data, etc.;
- the subsystem of other activities includes registers that are of unique nature and essential for the functioning of the above- mentioned subsystems (for example, over 400 unique nomenclatures).

Border Management Strategy - ICT infrastructure

"Integrated Border Management" of the CARDS 2001 programme has been started.

The aim of project is to draw up an overall strategy of integrated border management with a view to achieve the quality standard, that is the security standard which has been imposed by the European Union in the framework of protecting the existing and the future external borders of the EU within the meaning of the Treaty of Amsterdam and taken over from the Schengen regulations.

The implementation of project started on 1 October 2002 in co-operation with the representatives of the Federal Border Police of the Federal Republic of Germany and the representatives of the Ministry of the Interior of the Republic of Slovenia.

The Project comprises three major components regarding borders, these being: the harmonization of legislation, effective accomplishment of tasks (concept of organization and human resources, technical equipment, IT infrastructure, specific aspects of cross-border maritime, air and railway traffic), as well as professional and expert training of the border police officers. The Project will last for 14 months and its implementation will result in the drafting of guidelines and concepts for further development of the border police in the context of the alignment with European standards.

Databases and Registers in place

The Border Directorate uses the following registers prescribed by law and kept by the police:

- the Register of the number of persons crossing the state border;
- the Register of issued permits for carrying weapons and ammunition across the territory of the Republic of Croatia, issued certificates on temporary seizure of weapons and ammunition, on licenses for keeping and carrying of hunting weapons issued to the persons arriving to the Republic of Croatia for hunting, and to members of shooting clubs arriving to the Republic of Croatia for shooting competitions or preparations for such competitions;
- the Register of issued permits for the movement and stay at the border crossing points and permits for the movement and stay out of the border crossing point locations for international traffic;
- the Register of issued visas (i.e. the visas issued to persons at border crossing points);
- the Register of issued border passes;
- the Register of measures taken towards foreigners;
- the Register of violations of the state border;
- the Register of persons under reasonable doubt of having committed criminal acts, violations and offences;

Stated alignments with Government Interoperability Framework and the technological innovation will provide interoperability and Internet enabled portal integration solutions.

The Agency for the Protection of Personal Data

Agency exercises the following tasks as a public authority: supervises the implementation of personal data protection, points to reported abuses in personal data collection, drafts a list of states and international organizations that have adequately regulated personal data protection, decides on claims for determining the breach of rights guaranteed by the Act, and keeps the central register. The Agency may publish certain major decisions in the Official Gazette. The Agency supervises the implementation of personal data protection upon the request of a data subject, on proposal of a third party or ex officio. The Agency is obliged to consider all claims related to determining a breach of rights in the processing of personal data and inform the applicant on the measures undertaken.

On-line connections between visa issuing authorities

Online connections between diplomatic missions and consular offices and the Ministry of Foreign Affairs began in May 2002 with the implementation of the IKOS computer system (information-communication system). By July 2003, the system has been implemented in 21 diplomatic missions/consular offices in Europe.

Further online connections between the remaining diplomatic missions and consular offices and the Ministry of Foreign Affairs have been planned and it is envisaged that by the end of 2004, the IKOS system will be in place in all the diplomatic missions and consular offices of the Republic of Croatia abroad.

The "visa issuing" system represents a subsystem of IKOS. Diplomatic missions and consular offices in which the IKOS system has been implemented have been feeding all the visa applications into the system since 1 January 2003. T

The Ministry of the Interior is a co-user of the above-mentioned subsystem. Through IKOS, it receives all the visa applications for which a prior consent is required, as well as all the notifications of the intent to issue visas and all the information on issued visas.

Europol cooperation

A Working Group was established within the Ministry of the Interior with the aim of beginning preparations as soon as possible for negotiations on the conclusion of the Treaty on Co-operation with Europol.

Within the framework of the activities directed towards the accession to Europol, on 14 December 2002, within the Ministry of the Interior of the Republic of Croatia a working group was established for the preparation of negotiations for the conclusion of an Agreement on co-operation between the Republic of Croatia and Europol.

Terrestrial Trunked Radio (TETRA) - Technical requirements specification for Digital Advanced Wireless Service DAWS)

Functional and Technical Requirements for the new system for safety and security as a basis for governmental decisions regarding an agreement for a joint communications network for safety and security

as well as corresponding Feasibility Study has been completed by end of 2003. ETSI DAWS standards were fully respected.

National Intelligence Model

The first component of the National Intelligence Model (NIM) has been recently implemented. The Implementation Program to support NIM by a suite of analytical tools to ensure even more effective and efficient use of information and resources has been designed. These tools, intelligence databases and warehouses will effectively store, analyze and manage information as well as provide XML-ed standpoint for Court Case Management System interoperability.

3.6.4. MACEDONIA

Macedonian institutions do not offer on central level permanent e-governance services for the citizens and businesses. They are not even offered on local level, especially as a result of the fact that competences of the municipality to date were minor. Particularly there is a lack of offer of online services, and there only some cases of one way download of certain forms from the web sites. To that respect, from 30 web sites of the municipalities out of 124 municipalities currently existing in Macedonia, it is worth mentioning the solution offered by the web-site of the city of Skopje (http://www.skopje.gov.mk/), where some forms can be downloaded for submission of request for obtaining a license for passenger transportation by taxi car, forms that can be downloaded from the web site of the municipality of Bitola (http://www.bitola.gov.mk), and especially of the web site of Delcevo (www.delcevo.gov.mk), offering possibility, in addition to the one-way download of forms, of two-ways filling out of some forms. On the web site of Delcevo, following forms can be downloaded and filled out related to the requests for obtaining:

- Birth certificate,
- Marriage certificate,
- Death certificate,
- Citizenship claim,
- Construction license,
- Terms of construction,
- Extract of the Urban Plan,
- Tax application for establishment of the property tax,
- Tax application for establishment of the inheritance and gift taxes,
- Certificate of not having criminal record, etc.

Of the 14 constituent ministries of the central governmental administration, 10 ministries have their own web presentation on Internet and their own web site, out of which only 5 are updated. Even the web site of the Government of the Republic of Macedonia (www.gov.mk) is very poor in content and information, which apart from its links to the ministries that have their own web sites, national symbols and CVs of the ministers, has no other content. Meanwhile, the ministries that have their own web sites, offer only meager information and most of them are rather outdated, and there are even some that can create misconceptions among their subscribers (old version of some law is presented, though it has been amended meanwhile). Unfortunately, there is a problem with some of the ministries presenting their information only in Macedonian and not in English. Of all the updated Internet web sites only 2 offer some service for citizens through the download of different forms (which can not be filled out online) and those are Ministry of Economy (www.economy.gov.mk), and certainly Ministry of finance (www.finance.gov.mk), as a web site with the most useful and updated contents and information, laws, rulebooks, analysis, web polls, audio-video streaming etc. But, there is no information on any site about how often the web sites are updated.

Various governmental Agencies have their own web site, but again with limited range of services offered to the businesses and citizens.

In regard to the evaluation of the e-governance situation on central governmental and local level, few assessments were conducted, starting with the questionnaire for the ICT usage in the ministries, agencies, governmental organizations and public companies, carried out by CIT at the end of 2003, to the "Local e-Governance in Macedonia" project by UNDP which ended with the Assessment Report for ICT Infrastructure and Human resource capacity in all 124 municipalities in Macedonia. For this project a special methodology was developed, which consists of a procedure and set of indicators for evaluation of criteria quality and level of ICT usage. The methodology was based on questionnaires as an instrument to assess and collect information, and on a method of interviews within targeted municipalities. The questionnaires were adjusted to the specificities of various targeted respondents. The number of questions ranged from 36 to 543 per respondent, where respondents included municipality's administration, Local Public Enterprises (LPE), Local Branches of Ministries (Ministry of Transport & Communications, Ministry of Economy and Ministry of Finance) - LBM, as well as Local Branches of Public Revenue Office (LBPRO).

The Analysis reviews the local government and administration of all municipalities in the country by observing the following:

- IT specialists' level of knowledge, IT education and computer literacy of employees and members of municipality council, communication infrastructure, hardware and software equipment, information systems, computer network infrastructure, and Internet access.
- Services, workflow, and information flow in all municipalities - analysis of ongoing and future processes initiated by implementation of the Law on Local Governance (LLG) in the following relational discourses: within municipalities, with citizens and businesses, and with central republic governance and other municipalities.
- Existent ICT applications and key ICT services currently provided by municipalities, along with their ICT infrastructure and requirements.

The conclusions drawn from this analysis picture in precise facts and figures the municipalities' deficiency in ICT ideas, strategy and projects:

General observations

- The existing municipality profile categorizes them as municipalities without an implemented idea for importance of ICT and its usage. This is based on the conclusion that the percentage of budget spent on ICT and its development is very low and to the analysis of their actions and decisions towards ICT improvement. This means that municipalities do not set enough importance and priorities about ICT usage and do not identify the benefits of new technology to improve efficiency and effectiveness.
- The existing municipality profile is without a strategy for improvement of ICT usage. Nearly all municipality decision-making persons had heard about ICT and its benefits, but no action, decision or any plan is being made towards its improvement. However, there are several exceptions, where some initial projects have been realized, mainly due to sponsorships and donations.
- The level of the computer literacy of employees and members of the municipality council is very low, with a quality measure of 0.75 on a scale from 0 to 4. The value of 1 means basic IT skills and the value of at least 2, which means moderate IT skills, is recommended as the average for all municipality administration employees and decision-making electives in order to establish the e-government initiative and make its realization possible. In comparison to the educational background this value is very low. This makes it of a highest priority. Each employee or elective

personnel should have at least basic IT skills.

- The analysis showed that the level of paper work within the administration and electives for their work in committees and municipal council should be reduced and made more efficient if electronic document management and workflow are to be used. This also concerns local units/branch offices of public enterprises and ministries.

Employees and elective personnel

- The existing IT infrastructure quality of mayors is very low with a value of 1.64. It should approach a value of at least 3. The value of 58.87% of mayors that do not use IT infrastructure is very high. Each mayor should have and use IT infrastructure to reach municipal eReadiness. This makes the average value of coverage factor for quality measure to be 0.67. If all mayors should use IT infrastructure with appropriate quality, then this value should approach the quality measure and should aim to be at least with a value of 3.
- The existing IT infrastructure quality of municipal council presidents is very low with a value of 1.57. It should approach a value of at least 3. The value of 89.34% of council presidents that do not use IT infrastructure is extremely bad. Each president should have and use IT infrastructure to reach municipal eReadiness, mainly due to the fact of decision-making roles. This makes the average value of coverage factor for quality measure to be extremely low with value of 0.19. If all mayors should use IT infrastructure with an appropriate quality, then this value should approach the quality measure and should aim to be at least with a value of 3.
- The values of quality measure for IT skills of electives members of municipality council are very low and should have the value of at least 2. This means that each member of the municipal council, its president and mayor should have at least moderate IT skills. Persons that have a decision-making role must learn and foresee the future of these technologies.
- It is interesting that the educational background of mayors is on an excellent level, but not enough values for IT skills (1.57). Communication infrastructure (2.50) is better than the IT infrastructure (1.64) and should improve. The average value of mayors' ICT usage is 1.44. The lowest values for IT infrastructure and IT skills have the highest priority. The value of 0.67 for average coverage of IT infrastructure shows that this is not evenly distributed along all municipalities.
- The educational background of council presidents is on a satisfactory level. Very low values were obtained for communication and IT infrastructure. Similarly, the IT skills quality level is very low. The average value of presidents of municipal council ICT usage is 0.69 and the value of 0.84 was obtained as quality for the existing infrastructure and skills eliminating the zero values in computation. The value of 0.19 for average coverage of IT infrastructure means that IT infrastructure has a medium quality but not distributed equally. It makes IT infrastructure of the highest priority and the other two parameters for communication and IT skills have still a higher priority.
- It seems that elective members do not have satisfactory conditions at the municipalities and that they occasionally attend meetings and work in committees. Therefore, very low values were obtained for communication and IT infrastructure. In the table we also give values for ICT infrastructure the municipality members should use at home in order to access documents for conference and other activities. Surprisingly the IT skills quality level is very low. The average values for electives of municipal council ICT usage is 0.37 and value of 0.46 was obtained as the quality of the existing infrastructure and skills eliminating the zero values in computation. Increasing the level of IT skills has the same high priority.
- The educational background of departmental managers at municipalities is on an excellent level (3.76), but there are not enough IT skills (1.60). Communication infrastructure (1.71) is better than the IT infrastructure (1.44) and should improve. The quality measure of ICT usage is 1.32 and average value is 1.25. All indicators for communication and IT infrastructure, and IT skills show that their improvement has the highest priority, especially IT infrastructure.
- The quality measure for ICT usage of employees at municipalities of 1.04 was obtained as the quality of the existing infrastructure and skills eliminating the zero values in computation. The average value of 0.98 was obtained as coverage factor in respect to all employees at the municipality. All indicators for communication (1.40) and IT infrastructure (0.92), and IT skills (0.85) show that their improvement has the highest priority, especially IT infrastructure and IT skills.
- The educational background of departmental managers at local branch offices of ministries and public revenue offices is on an excellent level with a maximum grade, but there are not enough IT skills (1.16). Communication infrastructure (1.22) is twice as good as the IT infrastructure (0.63). The quality measure and average value of ICT usage is 0.87. All indicators for communication and IT infrastructure, and IT skills show that their improvements have the highest priority, especially IT infrastructure and then IT skills.
- The educational background of managers at local public enterprises is on an excellent level (3.92), but there are not enough IT skills. Communication infrastructure (2.30) is better than the IT infrastructure (1.42). The quality measure and average value of ICT usage is 1.42. All indicators for communication and IT infrastructure, and IT skills show the need for their improvement. IT skills and IT infrastructure should have the highest priority.

Municipalities

- The value of 2.30 for the quality measure and 2.28 for the average coverage of communications mean that the communication infrastructure is distributed equally in all municipalities. The analysis shows that each municipality has established relatively good telephone and mobile phone infrastructure for each employee in the municipality with corresponding quality values of 3.08 and 3.26 and average coverage values of 3.03 and 3.16. A medium coverage and quality of message leaving systems including faxes is expressed with values of 2.63 and 2.42. A very low quality of e-mail systems (1.22) and extremely low coverage of e-mails (0.51) is being used in municipalities. This makes the establishment of e-mail systems of the highest priority for improvement of communication infrastructure.
- The value of 1.18 for the quality measure and 1.10 for the average coverage of IT hardware infrastructure mean that the IT hardware infrastructure is distributed equally in all municipalities. This analysis shows that each municipality has established a more than medium quality and coverage of computers with appropriate values of 2.37 and 2.18. Multimedia peripherals are being used with less than medium quality and more than low coverage with quality measures of 1.76, 1.62, and 1.48 for printers, CD/DVD, and multimedia usage respectively; and respective average coverage values of 1.60, 1.31, and 1.37. LAN networks and Internet access are being implemented with a low quality (1.18 and 1.38) and there is very poor coverage and implementation with values of 0.23 and 0.61. This makes the establishment of LAN networks and Internet access of the highest priority for improvement of IT hardware infrastructure.
- The value of 1.33 for the quality measure and 1.24 for the average coverage of IT software infrastructure mean that the IT software infrastructure is distributed equally in all municipalities. This analysis shows that each municipality has established a medium quality and coverage of office applications with corresponding values of 2.00 and 1.85. The quality of operating systems being used and average

coverage values have respective values of 1.74 and 1.56 and are positioned between low and medium. Database and information systems usage are being implemented to a low quality (1.03) and there has very bad coverage and implementation (0.31). This makes the establishment of databases and information systems of the highest priority for improvement of IT software infrastructure.

Local branch offices of ministries and public revenue offices

- The value of 0.97 for the quality measure and the average coverage of communications mean that the communication infrastructure is distributed equally in all local branch offices of ministries and public revenue offices. The analysis shows that each municipality has established medium telephone and messaging systems infrastructure for each employee in local branch offices of ministries and public revenue offices with corresponding quality values of 2.30 and 2.31. The average coverage values for telephone lines are medium (2.30) and for messaging systems, low (1.25). The quality of mobile phones is between low and medium with a value of 1.49 but with very bad coverage with a value of 0.31. Very low quality of e-mail systems with a value approaching bad (0.47) and extremely bad coverage of e-mails (0.04) is being used in local branch offices of ministries and public revenue offices. This makes the establishment of e-mail systems of the highest priority for improvement of communication infrastructure.
- The value of 0.92 for the quality measure and 0.65 for the average coverage of IT hardware infrastructure mean that the IT hardware infrastructure is not distributed equally in all local branch offices of ministries and public revenue offices. This analysis shows that each local branch offices of ministries and public revenue office has established a less than medium quality of computers with a value of 1.79 and low coverage with a value of 1.12. Printers are being used with a value of 2.62 meaning between good and medium quality and less than medium coverage (1.75). Multimedia peripherals are being used with low quality and less than low coverage with quality measures of 1.23 and 1.15 for CD/DVD and multimedia usage; and average coverage values of 0.51 and 0.81. LAN networks are being installed with a medium quality but with low coverage value of 0.63. Internet access is being implemented with a low quality (1.00) and there is a very bad coverage of 0.04. This makes the establishment of Internet access and LAN networks of the highest priority for improvement of IT hardware infrastructure.
- The value of 1.07 for the quality measure and 0.67 for the average coverage of IT software infrastructure mean that the IT software infrastructure is not distributed equally in all local branch offices of ministries and public revenue offices. This analysis shows that each local branch offices of ministries and public revenue offices have established a medium quality and low coverage of office applications with corresponding values of 1.82 and 1.14. The quality of operating systems being used is low (1.27) and an average coverage value of 0.42 shows bad coverage. Database and information systems usage are being implemented with a medium quality (1.80) and there is bad coverage and implementation (0.45). This makes the establishment of databases and information systems, along with upgrade of operating systems of the highest priority for improvement of IT software infrastructure.

Local public enterprises

- The value of 0.87 for the quality measure and 0.79 for the average coverage of communications mean that the communication infrastructure is low and distributed equally in all local public enterprises. The analysis shows that each local public enterprise has established a low quality and coverage of telephone lines with corresponding values of 0.98 and 0.86. The quality and coverage of messaging systems is medium with a value of 2.25. The mobile phone infrastructure is bad with quality and average values of 0.22 and 0.19. Extremely bad, is the quality and coverage of e-mail systems with values of 0.04 and 0.01 close to zero. This makes the establishment of e-mail systems of the highest priority for improvement of communication infrastructure.
- The value of 0.94 for the quality measure and the average coverage of IT hardware infrastructure mean that the IT hardware infrastructure is low and it is distributed equally in all local public enterprises. This analysis shows that each local public enterprise has established a medium quality and coverage of computers with an appropriate value of 2.00. Multimedia peripherals are being used with a bad quality and coverage with quality measures of 0.44, 0.39, and 0.32 for printers, CD/DVD, and multimedia usage respectively; and respective average coverage values of 0.39, 0.39, and 0.32. LAN networks and Internet access are being implemented with a low quality (0.87 and 1.54) and there is low and bad coverage and implementation, with values of 0.54 and 0.88. This makes the establishment of multimedia peripherals, LAN networks, and Internet access of the highest priority for improvement of IT hardware infrastructure.
- The value of 1.27 for the quality measure and the average coverage of IT software infrastructure mean that the IT software infrastructure is low and is distributed equally in all local public enterprises. This analysis shows that each local public enterprise has established a medium quality and coverage of office applications and operating systems with corresponding values of 1.97 and 1.74. Database and information systems usage are being implemented with a bad quality (0.28) and there is very bad coverage and implementation (0.10). This makes the establishment of databases and information systems of the highest priority for improvement of IT software infrastructure.

Final conclusions

- The value of 1.42 for ICT infrastructure of municipalities means a value between low and medium. Mainly this is due to a medium value of 2.30 for communications. Low values were obtained for IT hardware and software infrastructure with corresponding values of 1.18 and 1.33. The worst value was obtained for IT skills with a low value of 0.85. This means that the highest priority should be improvement of IT skills, and then improvement of IT hardware and software.
- The value of 1.10 for ICT infrastructure of local branch offices of ministries and public revenue offices can be interpreted as of a low value. Although communications have the highest score they are still below medium with a value of 1.64. Low values were obtained for IT hardware and software infrastructure with corresponding values of 0.92 and 1.07. The worst value was obtained for IT skills with a low value of 0.75. This means that the highest priority should be improvement of IT skills, and then improvement of IT hardware and software.
- The value of 0.82 for ICT infrastructure of local public enterprises can be interpreted as of a low value. Only IT software has a value of 1.22, which means a little bit over low quality. IT hardware and communications have low values of 0.94 and 0.87. A bad value of 0.20 was obtained for IT skills. This means that the highest priority should be improvement of IT skills, and then improvement of communications, IT hardware and software.
- Municipalities have a higher quality measure than local branch offices of ministries and public revenue offices and local public enterprises. An average value of quality measure for analyzed units is low with a value of 1.07. The highest of all quality values (although with grade between low and medium) was scored for

communications with a value of 1.60, and then low value of 1.22 for software, and 1.01 for hardware. The worst is the average for IT skills with a bad value of 0.42. This makes improvement of IT skills the highest priority and then IT hardware.

The following table shows the quality measures of existing infrastructure of municipalities, local branch offices of ministries and public revenue offices, and local public enterprises. The key indicators are compared and quality measure of each unit is expressed separately.

Quality* of ICT infrastructure	Municipality	LBM, LBPRO	LPE	Average
IT skills	0.85	0.75	0.20	0.42
Communications	2.30	1.64	0.87	1.60
IT hardware	1.18	0.92	0.94	1.01
IT software	1.33	1.07	1.27	1.22
Total	1.42	1.10	0.82	1.07

**The scale of quality measures is from 0 to 4.*

The higher values were scored for communication infrastructure. Very low values were obtained for IT software and hardware infrastructure.
IT skills are extremely low; - need to be improved with the highest priority! This concerns education of basic IT skills for a very big number of employees and elective personnel and moderate and advanced skills for those that have basic IT skills.

A small improvement in communication infrastructure will score a level over the medium level. In this category the e-mail systems have the highest priority for improvements.
In category of IT hardware the improvement should be towards implementation of Internet access and installation of LAN networks.
In category of IT software the highest priority are the installation of databases and information systems.

3.6.5. MOLDOVA

3.6.5.1. G2C, G2B

The existing hardware in the governmental structures can be considered sufficient for the moment both quantitative, and qualitative. At the end of the 90's, beginning of 2000 was bought some brand name PCs, servers, network equipment, licensed soft. But in most of the cases there haven't been created informational systems, which would consider the new possibilities of hardware, and new technologies. It's often met the situation when there were paid hundreds of thousands dollars for the Oracle, Informix licenses, Web and Case technologies which have aged morally without being used. It is still worked with the informational systems, if they can be named this way, on the servers and on the PC IBM, HP, NCR, Cisco network equipment etc., which were created on the basis of the technologies from the beginning of 90's (FoxPro, without client-server, without Web technologies).

Most of the government sites provide personalized answers to citizens' questions. A frequent form of feedback is forum. Several official pages (of the President of the country, Ministry of Internal Affairs, Department of Information Technologies, Department for Development of Tourism, State Agency for Protection of Industrial Property) do declare feedback, though not all of them in fact ensure it.

Citizens can obtain online forms of tax declarations, however, they cannot send back their filled in forms. The Main State Tax Inspectorate (www.fisk.md) does not accept the downloaded and printed form as a valid one. The declaration must be copied into the form issued by their officer.

Government agencies do not offer databases for public access. The State Agency for Protection of Industrial Property offers an online library of guidance in the field, specimen documents (in 3 languages) required for registration of an invention, it also offers some auxiliary information, including work hours, though no online receipt of documents is possible.

There are almost no databases on Internet in Moldova. A database of legislative acts (www.lex.md) is offered against payment, and their license for one PC costs $300!

Here are some examples of good sites.

Department for Development of Tourism (www.turism.md) - is a well-structured site in three languages. It is enabled with a search facility. The feedback is ensured by Internet application form - a visitor can make a question and give his/her email address to receive answer. The site provides comprehensive information in its field of activities:

- background information about Moldova - history, geography, climate, traditions, languages, currency, etc.;
- information for visitors of Moldova: country's map, tourist places of interest, recommended routes, wine routes, receiving tourist agencies, conference facilities, etc.;
- regularly updated information - weather, news, recent developments in cultural life of the country, forthcoming exhibitions, presentations, etc.

Ministry of Internal Affairs (www.mai.md) - a site in Romanian and Russian languages, though not symmetric in this sense. It offers quite up-to-date news and criminal reports. It gives a historical overview of the Ministry, its organizational structure, necessary contacts, a list of services and even a price list (where necessary). It contains acts, laws and orders. It gives quite detailed contact information - addresses, telephones, services, a list of police commissariats. Periodicals (a newspaper and a magazine) edited by the Ministry can also be read online.

The National Bank of Moldova (www.bnm.org) - It exhibits procedural acts, decisions and regulations, and their regular updates, legislative framework, information about commercial banks, the NBM's annual reports, and model reports to be submitted by commercial banks to the NBM. Official daily rates of different currencies are available for any selected moment in time, as well as their dynamics during 90 days before the selected moment. Conversion of a selected currency into any other is available for any selected date. FAQ facility is available, design of banknotes in circulation and description of elements of defense are available. The site is in Romanian and English languages. However, no contact telephone number is provided.

State Agency for Protection of Industrial Property (www.agepi.md). Besides an online library of patent guidance, the site also offers all specimen documents (symmetrically in three languages) required for registration of an invention. News section is updated regularly. The site provides addresses and work hours for organizations that register patents. However, there is no online facility for submission of these documents.

State Fiscal Services of the Republic of Moldova (www.fisk.md) contains a list of tax reports and instructions how to fill them in, tax declaration forms. It displays replies to official letters. It gives addresses and telephone numbers of the territorial administrative sections of the tax service, but does not communicate their work hours.

The National Agency for Regulations in Telecommunications and Informatics (ANRTI) (www.anrti.md/index.htm) issues licenses for activities connected with electronic means of communication and telecommunication. It contains a list of documents and their specimens required to receive a license. It gives work hours. It provides a list of issued licenses and minutes of meetings on the issue and withdrawal of licenses.

Moldova's State Department for Privatization (www.privatization.md) gives brief information about enterprises to be privatized through auctions. The site is in English, with some information in Romanian as well. There is no feedback facility. The date of the last update is July 2003 for the English version and April 2003 for the Romanian version (as of 16 March and 14 April, 2004).

National Agency for Public Acquisitions (www.tender.md) offers information on government tenders: formulation, preconditions, and contact person. There is no feedback facility. Information about the last tenders is available for March 29 and 10, 2004. There is an archive of held tenders, but there is no information about their results. In the news section, there are two messages: of July 7, 2003 and September 26, 2003. The site declared three languages - Romanian, Russian and English. The link for the English language is not operational at all; the Russian language is supported only in part.

3.6.5.2. G2G

Parallel to the government documents on paper there are their electronic equivalents. However, there is no current exchange of electronic documents. The sites exhibit only electronic representation of official documents (not all and complete though).

The G2G branch does not work in Moldova yet, as it follows from the analysis of the government site and the sites of Moldova's ministries.

Official Site of the Republic of Moldova (www.moldova.md) does not provide links to all ministries and departments. The ministry's and department's sites are not homogeneous both as form and as content.

Sites of various ministries and departments are rather diverse in terms of their informational contents. This content is often not comparable to the importance of this ministry for the republic (for instance, the Ministry of Agriculture). Even very good sites do not provide full amount of necessary information.

No information is available concerning equipment maintenance and payroll expenditures, but they seem to be quite high. This is explained by the fact that too many ministries and even departments have their internal subdivisions or sub-departments of informational technologies or even computer centers - a common practice in the past century. The number of employees at each center can be quite high (up to 40, in some cases even more). Low salaries (less than 100 $) do not allow, as a result, employing highly qualified specialists. Each unit tried to elaborate the required software on its own. The level of their training does not allow developing a product of good quality; on the other hand, they hardly address some specialized institutions for soft development, and similarly no tender is organized for development of software.

The situation in e-Governance is largely confirmed by the results of the survey. All respondents, with the one exception, know about formulated ICT policy. The level of familiarization about State ICT-policy is insufficient at present time even in Governmental sphere. Four respondents (a half of officials) consider that formulated ICT strategy has already existed. Only one supposes that ICT strategy doesn't exist (note: this Strategy only in elaboration now).

At the question about a responsible body formed for ICT strategy implementation were received different answers:

- The Program of Information Society Strategy elaboration, supported by UNDP;
- The center of resources and informational networks;
- ICT development is put as a task for IT Department of Moldova;
- The general direction of IT in Department of Statistics and Sociology of RM.

Evaluation of ICT policy: it is considered as a progressive and important document for beginning more significant work. One respondent evaluates the aspects of ICT policy as unsatisfactory. Other opinion is that the State ICT policy is not well defined, every Ministry departments acts separately, and describes evaluation similar "from cart to automobile".

The opinions about development/implementation of an E-government strategy:

- The normal development/implementation degree of an e-Government strategy.
- There are no results in development/implementation of an e-Government strategy.
- Lack of official web-pages of central public administration doesn't permit to appreciate e-government strategy realization.
- The development must foresee involvement of all interested parts.

The collection of statistical data relating to Information Society: the familiarization with this problem is low: five out of eight respondents do not know about this information or did not answer this question. One respondent answered that it has not started and another considers that collection of statistical data has been started. Only one respondent is informed about start in tracking statistical indicators for Information Society in accordance with EU standards, elaboration of methodology for IS monitoring and about determination of ICT indicators. In this context, it is noted also about lack of resources for realization of this work in a whole volume.

3.6.6. SCG - KOSOVO

The actual e-Governance services offered by PISG to citizens and businesses in Kosovo are scarce, partial and little has been done to raise awareness among the public for existence of such services. In Kosovo, the e-Government endeavor undertaken this far has yet to yield serious outcomes. Move toward the Information Society will take long-term commitment and much more coordination of efforts, lead presumably by a higher government level such as Prime Minister's Office or a dedicated, yet to be established, "Information Society" Agency.

The existing on-line government services do not target any specific groups in particular. These are all merely presentation and limited information providing web pages. The Ministry of Agriculture, Forest and Rural Development (MAFRD) is the only one to offer comprehensive and well organized information, as well as downloadable forms for businesses and citizens (www.mafrd-kos.org).

Of the two leading ministries in the matters of the ICT policy making, currently, the MPS doesn't have a website, while the MTC website serves the purpose of internal discussion forum in addition to offering limited, mostly static information for the public. (www.mtpt.org, www.ekosova.org).

According to the regulation 2002/19, the MPS should, among others,

- "(v) Develop the information technology standards and services to be used by the Provisional Institutions of Self-Government and coordinate the provision of information technology services to the Provisional Institutions of Self-Government;..." and
- "(vii) Assist in the administration and maintenance of the central civil registry and database; (viii) Assist in the administration of policies related to civil documents, vehicle registration and NGO registration; (ix) Supervise the collection, maintenance, analysis and publication of official statistics;"

The most important function of MPS in relation to ICT rests in internal service providing to PISG, while from the citizen's point of view, it is within the domain of data protection. In reality, having available significant resources in funds (€1.998M) and staff (89) (see: Kosovo General Government 2003 Budget), the DIT of the MPS takes pride in its undertaking to serve as a hub for all events and developments in ICT, including, among others, drafting the National ICT Policy and Strategy. Unfortunately, the lack of evidence on the consultation process undertaken in this regard puts shadow on the possible outcomes of this process and also lowers the chances for their implementation. On the other side, currently, there is no law on protection of data and it is not clear whether MPS has been involved in drafting this law or other laws pertaining to ICT.

This far, the DIT's most evident undertakings in the policy making area is drafting and approving of the following policies that are applicable for civil servants in PISG:

- 2002-11-18 MPS - Acceptable Use Policy for Emailing and Internet Access
- 2002-12-20 MPS - Software and Hardware Policy
- 2003-03-26 MPS - Information Technology Staff Training Reimbursement Policy

In cooperation with the Post Telecom of Kosovo (PTK), the MPS has undertaken and completed a remarkable project of routing the optical cables in the capital Prishtina. The infrastructure has been completed and it interconnects all the ministries onto one optical backbone. This network facilitates effective, high-speed and reliable interchange of information between the ministries and provides shared resources such as connection to the Internet and mail system for all the ministries. It is expected that the MPS will expand this type of connectivity to a local government at the municipal level throughout Kosovo. However, for the time being, due to the previous contract arrangements, but also due to the lack of coordination and fragmented nature of the PISG, some of the ministries continue to have their LAN's connected onto the Internet through ISP's and endure in using their free, web-based mail accounts for official communication.

The Ministry of Transport and Communications (MTC) being responsible, (UNMIK Regulation 2001/19, September 2001) among others to: "(i) Develop policies and implement legislation... (v)...increase public awareness... (vi)...review compliance with European standards... (viii)...promote IT, e-Commerce, access to technology;...", in December 2003 initiated the first steps in developing capacity to define the needs and assess the performance in ICT in Kosovo.

The purpose of a project, funded and supported by KFOS, "Strategic planning Workshop: Defining ICT Strategy for the Ministry of Transport and Communications for 2005 - 2012", (December 2003) was to support a process which will develop the relevant and practical documents, methods and procedures of the Country ICT Strategy by engaging participants from the government, business, NGOs and academia. As a result of this intervention, a working group was set up to continue work on the preparation of the final document. The group is lead by the Ministry of Transport and Communications (MTC), which in addition provides space for discussion forum. The forum, currently restricted for the group members only, is said to go "live" once the final draft is ready.

Perhaps one of the most significant findings gained from the UNDP's public opinion poll in March 2003, "the level of confusion that currently appears to exist in the public mind about which part of government is responsible for which service in Kosovo. This is a basic public policy issue" reflects equally when it comes to the ICT National Policy and Strategy. (UNDP: "The Kosovo Mosaic: Perceptions of local government and public services in Kosovo", March 2003)

The lack of coordination between the two key Government players combined with non-involvement of a wider sector of interest groups may result in documents of questionable practical importance. The process of developing National ICT Policy and Strategy is treated detached from the real life; it is more viewed as an area of superiority within the Government. In addition, there is yet no awareness or at least there is no public assertion by the Government that the ICT is or will be at any extent an important, if not the core attribute of the country's economic development and as a roadway to escape from the broadening poverty. At most, ICT is conceived as a helping hand in public administration (see: The Programme of the Government of Kosovo, adopted May 2002, Annex1) and in servicing organizational structures of traditional economic areas such is energy production, mining industry and agriculture. Field research "ICT Country Status." (March-April 2004) shows that majority of the businesses (55.7%), consider that there is no high level of understanding of the role that the State needs to play in order for ICT to help combat poverty (D1Q13). Most of them (77.0%) consider that the public does not have a say in what programs would be of most value and in shaping their design (D1Q14). Similarly, 62.3% consider there are no reliable state, as well as other mechanisms for coordination and for partnerships with civil society institutions in ICT development (D1Q15).

Major programs and projects affecting e-Governance development

Since the establishment of UNMIK in 1999, international development agencies supported countless technical training programs for Kosovan civil servants. However, "The piecemeal approach to training driven by uncoordinated donor assistance has led, in part, to training programs that are often based excessively on supply instead of demand" (UNDP, Capacity Building for Kosovo - CBF), (www.kosovo.undp.org/Projects/CBF/cbf.htm). In addition, there was no central agency for foreign assistance coordination over time and therefore, it presents a challenge to track all the projects undertaken in the e-Governance area in Kosovo.

At present, there are several mayor lines of projects aimed at building the capacity of PISG to better serve the public including the e-Government component. These could be regarded generally as infrastructure or human capacity - civil servants training oriented projects. Most of these projects were initiated and are being supported by foreign donor agencies.

Inter Parliamentary Union/UNDP - Support to Parliamentary Electronic Archives in Kosovo (SPEAK) project is designed to strengthen the capacity of the Assembly and staff in terms of efficiency, information sharing and archiving allowing for better decision and policy making. It will foster public participation and political awareness, by disseminating the work of the Assembly to the Kosovan public. Founders for this project include EAR, Government of Norway, and UNDP. (www.ks.undp.org/Projects/SPEAK/speak.htm)

KFOS/UNDP - Support to Kosovo Information Technology (SKIT) project will undertake initiatives using ICT to address lack of ICT infrastructure for the Municipal Governments; lack of input from the public particularly rural and remote population at the Municipal level. (www.ks.undp.org/Projects/SKIT/SKIT.htm). Project encompasses installing Local Area Networks (LANs) and intranet systems in ten municipalities across Kosovo - a project that will hopefully extend to the remaining municipalities later this year.

UNDP - The Capacity Building Facility (CBF) is a flexible and strategic instrument to support the central and municipal institutions of Kosovo in strengthening democratic institutions and improving public administration. The CBF will fund a number of advisors to assist the PISG in the area of e-Governance. (www.ks.undp.org/Projects/CBF/cbf.htm)

EAR - Contribution to public administration reform, in 2003 amounted €5 million. (www.ear.eu.int/kosovo/kosovo.htm). An important momentum was achieved with the establishment of the Kosovo Institute for Public Administration - KIPA, a training institute attached to the Ministry of Public Services, which is in addition supported by UNDP, OSCE and EAR. KIPA will implement training policies as defined by the Ministry and deliver training as the main in-service training institution for Kosovo civil servants. KIPA has the latest technology and resources for training and is supposed to play an important role on promotion and implementation of the e-Government ideas as well as to directly help increase the practical skills of Kosovan civil servants.

Municipal document management system - Intranet project is supported jointly by KFOS and UNDP. It is delivering an Intranet solution for automation of document management procedures in Municipalities in Kosovo. It is designed such that enables civil servants to access all standardized documents and forms from a catalogue. Municipal employees can also schedule meetings, read announcements and use internal mailing system. UNDP and KFOS have also provided LANs and servers to the municipalities. The Intranet application was developed by a local company, ATI-KOS (www.ati-kos.com).

Kosovo Assembly Portal (www.assembly-kosova.org) is by all aspects a stunning website. It is a detailed presentation of the work performed by the Kosovo Assembly, its presidency, members and parliamentary groups, committees and laws adopted by the assembly as well as the schedule and discussions for the proposed laws. The Website of the Assembly of Kosovo was developed by the Division for Media and Public Relations of the Assembly of Kosovo supported by the OSCE Mission in Kosovo. It was designed, developed and implemented by a local company Rrota Interactive (www.rrota.net).

Availability of computerized government services for citizens

Preceding the first democratic elections after the war, in 1999 OSCE lead a partial census project of registering population above 18 years of age that, according to the law, had the voting right. This database is comprehensive and has been used for issuing ID, travel documents and driving licenses. Since then, no other mayor amendment of the civil register has been undertaken. Given that Kosovo has the youngest population in Europe, it can be assumed that much of the younger population that has since grown maturity, is being left out of this register. In addition, this has created incomprehensible difficulties for citizens in obtaining basic governmental services such is issuing IDs as it is tightly related to the voting register database.

Citizen experience of using computerized government services

In 2003, UNDP's "Mosaic..." survey indicated a fairly consistent and high level of satisfaction among the citizens with the efficient issuance of documents including: travel document, identification card, driver's license, vehicle registration, building/ construction permit, business license, and marriage/ birth/ death certificate. (UNDP: "The Kosovo Mosaic: Perceptions of local government and public services in Kosovo", March 2003). However, these results must be observed in a context of then recent pre-war and through-the-war experiences, when citizens were simply stripped out of their personnal documents.

Currently, the documents issuance procedure; submission and retrieval of civil documents and certificates, takes in average at least a couple of hours distributed in at least two days of in-line queuing. Recently, situation has further deteriorated in this regard upon imposing by UNMIK of the procedure that requires Kosovan citizens to prove their Kosovan "citizenship" prior to being issued and even renewed the documents issued by UNMIK. The procedure requires citizens to provide an older document, issued during the pre-war Serbia's reprisal regime when, as noted, many Kosovan citizens were taken away all of their personal documents. Apart from being intimidating and uncomfortable, the current in-line documents procession procedure is also very lengthy in spite of the fact that the usage of computer systems in administration has never been higher.

Web-based Government Service Portal

The ambitious project of Web-based Government Service Portal for the Government of Kosovo, prepared by the Ministry of Public Services, is currently at the stage of being finalized and contracted to the most successful vendor. (Bid Reference No. DIT/STH/030703-188).

Through the RFP issued in October 2003, Government of Kosovo, Ministry of Public Services, is seeking to contract with a qualified vendor to create and manage a Web-based Government Service Portal, or single access point, that will function as an interactive information and transaction system to enhance the ways in which citizens and businesses access government information and services over the Internet.

The portal will be a "citizen-centric", user-friendly and "one-stop shopping" site for citizens and businesses to access electronically

delivered government services while also providing access to many informational government Web sites that currently exist. It is anticipated that the portal will facilitate and improve the way citizens and businesses communicate and interact with the government. The portal will:

- Implement a Web-based Driver's License renewal process forty-five (45) days from contract award.
- Provide the general public informational searches on government data including GIS information.
- Provide development and delivery of a continually expanding set of basic government services.
- Leverage the Government's Merchant Services contract.
- Other high priority applications being planned or discussed include:
- Professional Licenses renewals
- Corporate Certificates and Copies
- Environmental Licenses and Permits

Portal design will present government as a seamless entity. Answers to citizen and business requests for information and the related services will come from different agencies, but will be presented to the citizen or business as one. Citizens and businesses will not necessarily know which government agency they need to work with in order to accomplish their desired task, i.e. renewal of licenses, start-up of a new business and obtaining information. The portal will be designed to make national or local government appear as a seamless singular entity.

The Government will establish a Portal Advisory Committee (PAC) to establish strategies and procedures governing the use of the Portal. Completion of the portal implicitly assumes that the necessary legal framework is in place. However, there is a concern that without the proper legislative framework, establishing of the PAC alone will not enable the government to realize many of the portal's features. The PAC will not have the power to endorse the procedures that are not envisaged by laws, in first place the security and data protection issues and e-commerce transactions. Worst even, the project may enter into a proprietary solutions that may be non-compatible with the regulative framework or policy papers, once defined.

E-Service costs

The Government intension is to offer many of the services and information to the public via portal free of charge, while some services will involve payment. In addition, some portal services will have fees charged on a subscription and/or on a per transaction basis, due to the added value and convenience of real-time access to the information or application. There are two cost recovery models discussed:

- Self-Supporting Government Service Portal
- Government funds the Service Portal and retains all revenue
- The portal project will cost the Government approx €1M initial cost while the running costs depend on the cost recovery model proposed by the contractor and adopted by the Government.

3.6.7. SCG - MONTENEGRO

E-Governance can progress and develop only if there are institutions that work as coordination bodies for e-Governance and as tools that make it possible.

Montenegro doesn't have developed institutional infrastructure needed for development of e-Governance. Present situation with Republic Secretariat for Development and its Department of ICT as only one agency for development of Information society is not the solution for the future ICT activities, eSEE Agenda requests. The problem is there is no defined communication between the governmental agencies within the ICT.

Republic Secretariat for Development has only a part of competency that can be in a function of e-Governance, but it's necessary to expand and agreed with the new objects. It's necessary too, to establish new governmental bodies for completed institutional framework for planning, managing, implementation and monitoring of development of e-Governance.

E-Governance is a challenge for Montenegro, to do all necessary changes within the reorganization of state administration that can rank Montenegro in line with European countries, with advanced services for citizens, business and all society.

Montenegro wants state administration that is cheap, that gives more, faster and quality services for its citizens and business. It's a big challenge and a hard task for Montenegro, because of the limited resources disposed for this attempt.

There is a reorganization of state administration in the Government of Montenegro. The Internet site of the Government of Montenegro has the element of e-Governance. Through the portal of the Government, the portals of all governmental agencies are included.

Every governmental agency has a web site and all information about their daily activities is on-line. There is the communication with the citizens, too. Presentations of many of Montenegrin cities are on-line, too.

The first phase of e-Governance should to be a support for G2C and G2B. The fields which are the base of e-Governance are: registers and applications by which governmental agencies and local bodies maintain the registers; computer network of governmental agencies and local bodies; system of safety and security and laws, sub law records and standards. The joint registers are: register of citizens; register of addresses; register of immobility and register of economic societies.

There are on-line opportunity for unemployed to get all information about the free work places in five Montenegrin municipalities: Podgorica, Berane, Bijelo Polje, Plav and Bar.

Projects:

Register of economy societies	Project performs within the first phase. The second phase will offer the possibilities to the citizens to address the requests via Internet.
Information System of Jurisdiction	This project includes the main courts and court departments and it is in the phase of introduction. There are about 400 computers in these institutions.
Information System of taxes	Project has covered the first phase of VAT. In the phase of preparation is the project for conjoint collection of taxes. It included the register of taxes tributary and the registrar of all assurors. The aim is to make easier the procedure with "one paper for everything".

Information System of Custom Office	It's the work of paying duty and duty control. The second phase is in procedure of consideration.
State Treasury	This project is in function within the government and governmental agencies.
Registry of population	This is old application necessary to be changed and developed. It comprises the data of register books of birth, marriage and death.
Geography Information System	This is the project of Directorate for real property. Urban and rural areas are screened and digitalized (south and central region and a part of north).

- The government network is not broadband network, but the plan is to be a part of Telecom network, through the VPN.
- There are about 3 000 computers in governmental agencies and 95% have Internet connection.
- There were training and special courses in the past, but the present situation characterizes the lack of IT experts within the Government.
- In the last few years there is no organized training of employees on the government level for using computer (only within the particular ministries). Employees are mostly self-educated.
- There are IT educated individuals in governmental, but the fact is that many government employees just have computer on its desk.
- The average salary of ICT experts is 250 €.

3.6.8. SCG - SERBIA

Many governmental web sites exist providing basic information, often directed at parties outside of the community. This information is static and infrequently updated, with some exceptions (i.e. Government of the Republic of Serbia). The final aim is to make available at government sites rich and highly developed set of services that will motivate public sector, business sector and sufficiently large user population to invest in the provision of Internet based services. Most e-government services that are currently available, are limited to simple one-way interaction where information is posted online and forms can be downloaded. Downloaded forms need to be completed by hand and returned by post. Effort is still required in ensuring a full complete of two-way transaction capabilities. There has not still been a significant increase in the implementation of services providing two-way interactions (UN, ECE, pg. 30-31).

Government services for citizens

The interaction with citizens is infrequent and is mainly paper based. Some limited interaction is possible by telephone or fax. There are only few electronic services available, such as checking the election polling lists. There is some online interaction with specific institutions.

Online services for business (suppliers and contractors)

The interaction between government and business sector is still mainly fax, phone and paper-based.

Information Technology and Internet Agency is the main body at the Government of Serbia coordinating the development of e-Government systems. That is, legally ITIA is responsible for the improvement, development and operation of IT systems, application and use of the Internet, data protection and development and application of standards in the implementation of IT technologies in government institutions. In practice, its ability to coordinate all activities among the Ministries is limited, due to the limited resources and short history.

ITIA has been active in drafting several strategic documents. One of them, titled "E-Government - the Project of Establishing Electronic Public Administration in the Republic of Serbia" (2002) serves as a foundation for the adoption of the Government platform and strategy, and creation of strategic e-Projects in the ITIA. Although there are very few examples of the actual e-Government applications (such as the recent possibility for the citizen to check if he/she is a registered voter via Internet), progress in the use of ICT in government institutions has improved during 2001-2003.

According to ITIA, the main obstacle in deploying a fully computerized Government is the lack of the appropriate infrastructure and hardware equipment. ICT equipment is still not considered a working tool or a requirement for normal business operations. Therefore the Ministries do not regularly invest in such technology, upgrades, maintenance, specific software applications or training that would lead to the improvement of ICT skills of their employees.

All Ministries have to respect the Law on Public Procurement. The process of procurement is facilitated either by the Ministry/institution itself (specific, dedicated ICT equipment) or by the Directorate of Joint Affairs (general purpose ICT equipment, disks, office consumables etc.).

Ministries still hesitate to seek specific software applications and training for their employees. ITIA has been assisting them to find reliable partners. ITIA has negotiated the agreements on strategic partnerships with major international IT companies on behalf of the Government of Serbia. All government institutions are using free Microsoft Licenses until 2005.

Concerning implementation of ICTs in public administration, the main reform areas are the judicial system, fiscal policy, privatization and the development of SMEs. Progress in these areas is evident. However, it is important to raise the level of awareness on the benefits of the use of ICTs, introduce appropriate EU assessments/benchmarks and adopt a new legal framework. Our analysis will try to exam situation and project under way in ministries, municipalities and courts.

Ministries

The best situation regarding the use of ICT is in the Ministries responsible for economic and fiscal policy (M. of International Economic Relations, M. of Finance and Economy, M. of Economy and Privatization, Agency for Privatization), reform of public administration (Agency for Public Administration Development) and new government institutions. Capacity of these ministries has been built through projects sponsored by international organizations. International assistance has been recently shifted towards institutions responsible for health, social and poverty reduction policy (M. of Health, M. of Social Affairs).

In addition, Ministry of Interior is improving its current IT system. Already implemented is the system featuring the new IBM computer which contains a database of citizens, ID and vehicle documents. This system is connected to the European network, and provides the possibility of analyzing personal data within 10 seconds. Every search is based on the finger-prints and photographs.

During 2004, the Ministry of Interior will start issuing the new ID documents to citizens - ID and weapon license cards, driver's licenses, and passports. ID cards will be "smart cards" and contain all relevant information in digital form, including the finger- prints. The entire document issuance process will be fully digital, thus reducing the time needed for approval and improving the reliability of identification. It is expected that these systems will improve the efficiency of the police and reduce criminal activities in the country.

Other project worth mentioning are the following:

- ITIA is involved in the preparation of the financial system for public institutions in Serbia. This system has been developed in order to plan the state budget and monitor public revenues/expenses. All budget users - both direct (ministries, municipalities) and indirect (schools, hospitals etc.), will have access to the system (user levels), list their requirements and communicate with the treasury (direct payments etc.). Also, the system will support budget planning from fiscal year 2005. By June 2004, a software solution will be completed and approved. Training will be organized for all prospective system users.
- The project "Networking the Serbian Process of Legislation" had the goal to develop a document exchange system for the use in government institutions, and thus improve the transparency of drafting regulations and laws. This complex project has involved the Agency for Public Administration Development, Government of Norway and ITIA. ITIA has provided support in the domain of IT equipment, network infrastructure, implementation of communications between participants, security measures (firewall) and training, but had not had the authority to empower its decisions/recommendations regarding software development.

Municipalities

Regarding ICT, municipalities are in a similar state as the ministries. Local government is facing a poor and still centralized administrative framework, a difficult economic environment, poor public services and a lack of municipal management.

The automation of some municipal functions is achieved in selected municipalities. Most frequent applications involve creation of databases for recording requests of citizens, archiving directories/request numbers, management of financial information. In some municipalities, citizens have the possibility to inquire about the submitted requests via telephone, and obtain information regarding the status of such requests. This, however is quite an unusual practice.

Other municipalities have started to initiate the implementation of the Municipal Integrated Information System. ITIA assists them by providing guidance (annual conference on eGovernment) and recommendations upon their requests.

Access to ICT is provided mainly in municipalities around Belgrade, Novi Sad, Nis and other cities. The Vojvodina province has shown considerable progress in the application of ICT, with pilot projects in Kikinda and Zrenjanin. These municipalities enable their citizens to request relevant documents via the Internet. Good practice is also noted in the municipalities of Subotica, Nis, and Sabac.

Some municipalities wishing to implement adequate software solutions have faced a legal problem. Two companies (Bull and Mega) are claiming property rights to dedicated software, which has already been developed and installed in several Serbian municipalities. Although ITIA is monitoring this process, it does not have the power to resolve the situation or the ability to impose the application of either software.

Concerning projects on this level, the following should be mentioned:

- In spring 2002, ITIA has completed a survey on IT resources in Serbian municipalities. This project has been supported by DFID. A report has been published in association with Halifax Consulting, a USAid partner. Various programs of municipal support are underway or planned by a number of donors (EAR, USAid, UNDP). The EAR supports the Municipal Support Programme, which involves improvement of public services and municipal management. USAid is implementing the Serbian Local Government Reform Programme (SLGRP). This programme currently covers 88 municipalities, and has the objective to improve municipal management and capacity in several areas, including information technology, public procurement and financial management.
- Swiss Development and Cooperation Directorate (SDC) in Serbia and Montenegro is supporting a Municipal Support Programme. Seven Serbian municipalities - Cacak, Kraljevo, Kuršumlija, Niš, Novi Pazar, Po ega i U ice are participating in the 4,1 million EURO program since December 2000. Among the objectives of this programme are the improvement of management capacity and better quality of delivered services to citizens. It is expected that adequate management systems (including MIS) will be developed by April 2004.

Further progress in the use of ICT by municipalities can be achieved by the improvement of cooperation between ITIA, various municipal organizations (especially Standing Conference of Towns and Municipalities), IT companies and the donor community.

Courts

Justice sector is of particular concern to Serbia, neighboring countries and international community. Serbia is facing an increase in local and organized crime. There is a growing consensus on the need to take swift and effective action by bolstering existing law enforcement agencies, and ensuring that they operate in EU compatible framework in terms of legislation and work processes.

By late 2002, all 16 Commercial Courts have been wired and had software in place. The Ministry of Justice has not provided the equipment according to the plan (by February 2003). In the mean time, the Government has decided to delegate the registration of companies to a new Agency, established specifically for this purpose, which has obtained the support of the World Bank. Sida is supporting this project via the World Bank.

ICT reforms in courts are generally compliant with the existing IT Framework, such as the document called "Legal Information System". Unfortunately, the implementation of ICT is not considered a priority by the Ministry of Justice, despite the fact that financial resources are available (income from court taxes).

In 2002, ITIA successfully completed a project of networking commercial courts, enabling registration of companies online.

The implementation ICT in Serbian justice institutions has started, with several projects supported by international organizations (USAid,

UNDP, EAR and others). The main project, sponsored by the EAR, is targeting the Supreme and Regional Courts, and the corresponding Public Prosecutor's Offices. A consulting company (Tales) has been selected by EAR to implement the project and ensure that these institutions have hardware, software and appropriate procedures in place. Due to considerable differences between the incompatible ICT solutions already installed in beneficiary institutions, the project team has decided to monitor their performance. The best solution will be applied upon the finalization of this phase. Another project obstacle is the existing legal problem on the ownership rights between two companies (Bull and Mega). Both companies claim rights to the already installed software.

Current ITIA activities can be summed up in two main filed project and studies.

A) ITIA Current Projects

ITIA is a recognized partner of local public institutions and the international donor community. Together with the responsible line ministries, it is currently involved in the following projects:

- *Health Investment Project, Ministry of Health* This project is supported by the World Bank (US$ 20M). Sida donates funds to this project via the World Bank. ITIA is involved in one of the key project components - a modern Health Management Information System, which would help develop a sustainable, performance oriented health care system.
- *IT Solution for Belgrade Pharmacy Organization Supported by the Government of Norway*. ITIA is involved in the specification of hardware and software application, creation of database and system installation.
- *Development of Modern HRM in the Civil Service, Agency for Public AdministrationDevelopment*Supported by Sida. ITIA is monitoring the installation and operation of the Human Resource Management Information System in several government organizations. Prior to the procurement, ITIA was involved in the evaluation of tender proposals.
- *Electronic Registration of Companies* Supported by the World Bank. In the past registration of companies has been conducted via Commercial Courts. However, the Government has decided to assign this task to the newly formed Agency for the Registration of Companies. ITIA has been actively involved in both projects.
- *Cadastre Project, Serbian Geodetic Institute* Supported by the World Bank. ITIA has established excellent cooperation with the Geodetic Institute, and expects to participate in the project once it commences.
- *Serbian Local Government Reform Programme* (SLGRP ,. Supported by USAid (US$ 26.8). ITIA is participating in the implementation of this project, which has the objective to improve management and capacity in the field of ICT. The project involves 50 Serbian Municipalities.
- *Reform of Social Welfare Policy, Ministry of Social Affairs* Supported by DFID. ITIA is participating in an Inter-Ministerial Steering Committee, which is assigned to this important task.

ITIA carefully monitors activities of the State, Union and International institutions, and has particular interest in projects, which require its expertise. ITIA has the policy to get fully involved in all projects that correspond to its scope of work and thus fulfill its mandate. Although this is not always possible, ITIA is dedicated to perform its role and provide quality service to relevant institutions, companies and citizens.

B) Studies prepared by ITIA

The main objective of ITIA is to implement ICT efficiently to the government, educational, business and social sector in Serbia. ITIA also aims to stimulate the creation of the Information Society, in order to bring Serbia in line with its peer group and enable integration in the European Union. To achieve these goals ITIA analyses principles in the developed countries and countries in transition, and adopts "best practice" solutions for the Republic of Serbia.

ITIA has recognized the importance of the Stability Pact eSEE Initiative, which has the purpose to bridge the digital divide currently existing between SE Europe and the EU. ITIA has been actively involved in drafting strategies, developing concrete project proposals and suggesting on how these might be financed. The guidelines/results of this Initiative are implemented into ITIA activities and are included into the Government plans. ITIA has taken many actions to gain support of civil servants and relevant politicians for the implementation of eGovernment. In addition to regular reports on its activities and project developments provided to the Government of Serbia, ITIA has submitted several Studies to Serbian and International institutions. The most important among these documents are the following:

- "Conclusions and Recommendations" from the conference "Building an ICT Investment Strategy in Yugoslavia" (2001) contains priorities, key experiences and issues, and priorities/concerns expressed by private and public sector representatives. This report has been adopted by the Federal and Republican governments.
- "E-Government - the Project of Establishing Electronic Public Administration in the Republic of Serbia" (2002). This document, prepared by ITIA, is intended to serve as a foundation for the adoption of the Government platform and strategy, and creation of strategic e-Projects in the ITIA.
- "ICT in Public Administration - Resource Inventory Report". This report has been prepared by Halifax Consulting and ITIA. Previously, ITIA has gathered information on IT and human resources in 706 institutions, and created the appropriate data base. This project has been supported by DFiD.
- "Towards a Knowledge-Based Economy, Yugoslavia" (Nov 2002) is a country readiness assessment report, prepared for the United Nations Economic Commission for Europe. The report, prepared by the national expert (employee of ITIA), provides an overview of the situation in the areas relevant to the development and functioning of knowledge-based economy. It describes country's potential to participate in the networked world.
- "eSEE Agenda on the Development of the Information Society" (October 2002). This document is committed to the fulfillment of a number of international obligations. ITIA has prepared the program for the implementation of the Agenda. Although formally signed by the (former) Minister of Science, the Agenda was not submitted to the Government of Serbia for ratification and implementation.
- "Conclusions and Recommendations of the Telecommunications for Development Conference" (October 2002). This ministerial conference, organized by ITIA and the Stability Pact, brought together over 300 participants, including heads of international and regional organizations, government officials, non-governmental organizations, and businesses. This documents contains a review of the impact of policy, regulatory framework and infrastructure on the development of the Information Society, economic growth and European integration in the South Eastern Europe.
- "National Information Society Policy of the Republic of Serbia" (March 2003). This document, prepared by the former director Mr. Branislav Andjelic, is compliant to the eSEE Common Guidelines for

National IS policies, and in line with the adopted "eSEE Agenda on the Development of Information Society".

- "Law on Electronic Business and Digital Signature". A final version of this Law was submitted to the Serbian Parliament for the Adoption in summer 2003, but was not adopted due to the parliamentary crises. The steering committee, involved in drafting this Law, is headed by an ITIA expert. The committee is currently working on four regulatory documents, which correspond to the Law and specify methods of its implementation. This project is supported by EBRD.
- Draft Laws. ITIA has been involved in the process of formulating several Draft Acts, such as the Law on Public Procurement, the Law on Intellectual Property Protection and the Law on Telecommunications.
- "Security of IT Systems" (Draft, Spring 2003). These guidelines are dedicated to the certification of security and accreditation of IT systems.
- "Training for Improved Management of Reform Policies and Programmes". This document is a follow-up of a United Nations Development Programme (UNDP) sponsored project. Following a careful assessment of needs, UNDP has designed programs to build capacity of the Serbian Public Administration. ITIA has been actively involved in project design, organization and implementation.
- "ICT Bulletin" is a weekly bulletin, published by ITIA in association with Tanjug (national news agency). Copies of this bulletin were distributed to public administration institutions in 2003 in hard copies or in an electronic form.

C) ITIA actively participates in the activities of professional associations, non-governmental organizations, international organizations, at seminars and conferences. The developed network of contacts is very important for multilateral cooperation, collecting/sharing information, conducting analysis, studies and preparation of relevant documents. Thus ITIA represents all interest groups from the sphere of ICT. ITIA has established excellent and friendly relations with all media in the country and has also promoted the development policy of the Government of Serbia. Since its foundation there has not been a single unfavorable media report on ITIA.

Questionnaire research results from Government Sector (sample 31 governmental institutions from Ministry level to municipality and local government level)

Concerning research results from government sector the majority consider that there is no formulated ICT policy (59,3% of valid cases) and strategy (778,% of valid cases). ITIDA should be the responsible body for this. Suggestion for improvements go in the direction that financial means should be secure, employees should be educated, there is more marketing and raising awareness needed and there is a need for establishment of the government body aimed at creation and implementation of ICT development.

In 52,2% of valid answers government organizations think that there has been some start in colleting data relating to Information Society, but 94,4% of valid answers indicate that there is no start in tracing statistical indicators for Information Society in accordance with EU standards. Government is also very inactive in promotion of Information Society development. Government do not publish any material related to Information Society (70% of negative answers), only some of governmental representatives are aware of publications printed by ITIDA or "E-vlada" published by Agency for Public Administration Development. Also majority (63,6%) is not aware of media campaigns to promote this cause.

Having in mind that many relevant laws did not pass yet (e -signature, cyber-crime) and that regulatory agency for telecommunication is not organized governmental representatives describe that we are at a very beginning of the process of harmonization with Acquis Communautaire.

In 70% or relevant answers respondents are not aware that there is any Institutional Capacity Building project in the government related to IT and state related data, while 30% think that there are such projects Also in 81,8% of valid answers government organizations do not use e-learning facilities to increase capacities for management processes. The most common reason is low computer literacy that limits possibility to use e-learning tools. A financial management IT system that includes all governmental institutions and state related data is being developed and scheduled to be operational sometime in 2005. There is no process management IT tool developed to support specific function of the government (56,3% of negative valid answers).

Considering the availability of computers, Internet connections and WEB sites in government institutions the situation is the following:

A) In 50% of reported 31 cases government institutions have 38 or less computers, and in the 50% of reported 31 cases government institutions have 8 or less computers connected to Internet.
B) In about 50% of reported 31 cases 40 or less employees use computers and 10 or less employees use e-mail/Internet.

Government institutions listed very similar barriers when explaining the problems in using computers for all employees and in using e-mail or Internet. Most often mentioned barriers are the following for all three cases: insufficiency of PC, education and inexperience, inadequate skills. Courses and self-education are two the most often ways that employees are trained for computer use, use of e-mail, or Internet.

In government sector computers are mainly used for business purposes, for bookkeeping, data-base, citizens services, typing. E-mail main purpose is communication with partners from public and government sector, for colleting information and data. Internet serves for collecting information and for research about some foreign practices in governmental activities. Purpose of WEB is for promotion of government institutions and their activities and for establishing contacts with other organizations.

Majority government institutions (71,9%) have WEB sites and the reasons for it are to provide information for different users, information for citizens, spreading awareness about their activities, transparency of work in Ministry or Municipality, to announce the news, to invite people to conferences etc. Those who have not WEB yet comment it by insufficiency of money or that preparations are in progress.

In 54,5% of valid answers government institutions organization do not know about initiatives of state to bring connectivity to rural areas, or to ensure support for ICT use in low-income communities (73,9%). Majority that answered (88,9%) to this question consider such activities as expensive either for state or for end-users.

According to government sector population is not fully aware of the opportunities that ICT has to offer and government institutions are not familiar that there are programs to increase that awareness (70,8%).

Although current state of e-government is characterized by no existence of effective system of decentralized decision making that will engage participation of low income and traditionally disenfranchised groups, (90,59%) and by low level of understanding of the role that the State needs to play in order for ICT to help combat poverty (87,0%), governmental institutions consider that efforts have been made to ensure that the formal school system, teachers in particular, are fully equipped to help students benefit form computerized and networking learning in 73,9% of all valid answers.

3.7. ICT FOR BUSINESS AND E-BUSINESS

3.7.1. ALBANIA

The number of active enterprises in 2000 is 35,477; compared to 1999 it has decreased by 0.6%. Very small enterprises are 32,675 having 1-4 employees. An increase of 4% is observed in Transport & Communication, mainly in road transport, a total of 5,933. Services increased also with 5%, a total of 6738 enterprises in 2000.(INSTAT 2002).

The share of enterprises by economic activity is as follows:

- Industry 10.6%,
- Construction 3.2%,
- Transport and Communication 16.7%,
- Trade 50.5%,
- Services 19.0%.

The turnover of enterprises over the years increased on average around 16%. The average change per sector amounts to:

- Construction 26%
- Trade, Transport and Communication, 20-22%,
- Industry 4.4 %, and
- Services only 1%.

The activity of the transport and communication economic sector is about 14.8% of the overall Production.

Investments of enterprises reached following levels in 2000 [INSTAT]

Sector	Turnover		Investments	
Transport & Communication	37,904 MLeks	344 M.USD	5,743 MLeks	52 M.USD
Commerce	135,779 MLeks	1,234 M.USD	2,826 MLeks	25 M.USD
Services	18,733 MLeks	170 M.USD	1,202 MLeks	11 M.USD
Total	279,683 MLeks	2,542 M.USD	23,113 MLeks	210 M.USD

Despite increased interest for Internet access from enterprises, it is used mainly for information searching. Internet penetration within public and private companies counts for 80% of the total amount.

Number of web sites is small, which is reflected in low number of commercial domain names: 1,030. E-mail is used only in 22% of the cases for transaction with partners, while dominating faxes and telephone. 90% uses Internet to collect information [TIPS].

First steps are made for electronic directories. An example is "Tirana Guide" published in paper and on line at http://www.tir-anaguide.com/. Information in this guide is not complete - a number of SME-s active on ICT are not included, and on line in beginning of 2004 was the edition of 2002.

This backwardness is correlated with banking sector situation.

First, number of credit and debit cards in Albania is very limited. Credit cards are issued based on individual agreements Albanian banks have with parent banks, which have agreements with major credit cards companies. The number of commercial and service activities that accept credit cards is very limited. Albanian banks are in their first steps issuing debit cards and installing ATM machines in the country.

Second, Internet-based bank transactions are implemented only by one bank (American Bank of Albania, http://www.ambankalb.com) that has the only SSL server using digital certificates received by Verisign. This bank use CitiCorp's WebCAS software and offers remote checking of accounts, fund transfers, and pay few taxes or bills. Other banks have plans to implement similar services, but costs seem too high to justify such investments. A major obstacle is lack of a law on digital signatures in the country. As conclusion, electronic fund transfers are very limited in Albania.

Some new developments in this direction include an initiative of government to start payments of salaries in some public sectors through banks, instead of traditional practice based on finance offices of organizations. Also Albanian Posts has payment services that may be used to pay some taxes and bills, and plans to establish Post Bank services that will offer fund transfer and electronic payment services.

Actually all transfers between banks have to be reported to the Bank of Albania. Bank of Albania has developed two projects on Real Time Gross Settlement and Automatic Clearing House, aided by World Bank and International Monetary Fund. A legal framework for stimulation of electronic payments and market initiatives is apparently prepared by bank of Albania and the law that would permit banks to do direct transactions with each other without going through central bank may be issue in the near future. The reporting system other banks use to report their activities in the Central bank are improved, and there is work in progress for further reformation and standardization.

A third project is designed to link Albanian chambers of commerce and industry and help them to create web sites with information about investments, trade and markets.

Emerging electronic activities of Albanian banks is associated with corresponding deployment of ICT:

- Percentage of employees working directly in ICT varies between 1% and 8% with an average of 4.8%
- Most banks percentage of computers related to the number of employees varies between 75% and 100%, with an average of 84.7% (only two banks have less that 55% and three banks more than 100%)
- Percentage of networked computers in 93.3%
- An average of 23% of computers are used at reception desks serving the public.

Banks use different solutions to communicate with their branches in other districts. From 13 banks operating in Albania did data transfer in following ways:

- 2 banks used to transfer physically the data on floppies and CDs
- 5 banks used normal dial-up access
- 5 banks used dedicated phone lines
- 3 banks use satellite links
- 2 banks use wireless modems

Some of banks do apply dual methods for data transfer. Intranet systems work in 48% of banks, while other banks have plans to develop intranet systems in the near future.

Only 2 banks do not have Internet access. Others use different solutions:

- 8 banks use dial-up access
- 1 bank uses satellite link
- 2 banks use wireless modems
- 2 banks use dedicated phone lines

Internet access from banks employees is low, with an average of 18%, and 25% of employees use email. Only one bank (American Bank of Albania) provides Internet access to all employees.

International banking communication is based on SWIFT (11 banks) and Reuters (10 banks), while one bank uses Bloomberg system.

3.7.2. BOSNIA AND HERZEGOVINA

3.7.2.1. OVERVIEW

In Bosnia, commercial corporate users pay a lot for Internet usage. This is the main reason why the commercial usage of Internet by Bosnian companies is still in the rudimentary stage. The lack of cheap Internet resources and services provides no chance for typical e-commerce and e-business models.

Of course, there is the other side of the coin. The very few of Bosnian companies are aware of Internet power and new ways of doing business. This can be easily explained by bad situation regarding the education of managers, especially in big, still non-privatized companies. The old management structures have never received any kind of formal or informal education on Internet usage, globalization trends, and similar issues. Young managers having at least formal education which included such topics, still do not considerably influence the strategic decision making processes in these companies.

Smaller and private companies are having younger and more agile management structures. Many of such companies are thinking of Internet as of a new tool for doing business and increasing the profit. However, the majority of such companies are still having symbolic Internet presence.

There is an important reason for that: the lack of cyber space market. The most of the BiH companies are concentrated on domestic market, and potential customers from this market are present almost 100% only in real space. The very few of them are regularly visiting the cyber space. In such situation, even the symbolic access and presentation in cyber space is very questionable as an investment.

In such environment, the Internet/Intranet technologies are mostly used for data retrieval and communication (internal and business-to-business). There is very few of companies having Internet based presentation, marketing, selling or other kinds of B2C e-commerce models. Almost none of the Bosnian companies do business exclusively through Internet, and totally depend on Internet.

The banking sector is important class of Internet users of corporate/commercial category. The most of the local banks have adopted Intranet based solutions for internal connection of departments and branches. There is more and more banks connecting globally (SWIFT MasterCard, Visa). This trend shows that, even though no Bosnian bank is even close to full electronic/Internet banking, this sector shall be seriously considered as one of the most important commercial Internet users in the future.

Overall Assessment of e-Business Enablers

Telecom operators / ISP

- Monopolistic behavior
- Long delivery time for services
- Price of services considered high
- Service quality is perceived low
- Incumbent highly favors own ISP
- Cross subsidizing

Postal operators

- Postal services not trusted for valuable shipments
- No payment-on-delivery services available
- Customs problems for international shipments

Financial institutions

- Mainly cash-based society
- Basic e-banking services not available to satisfactory level
- Internet/electronic payments are under development

Government

- Lack of adequate legislation that would legally regulate framework for conduct of electronic business,
- Unclear, changeable and often uncoordinated entity legislation represents a barrier for new business initiatives within this sector,
- Existence of numerous cases of inadequately determined responsibilities of certain bodies on state and entity level with regards to decision-making about the conditions for ICT application and conduct of electronic business,
- Import customs duties for information-communication equipment are unjustifiable barrier for wider utilization of such technology and Internet access,
- Lack of clearly defined supportive measures for the development of small business in general, and particularly measures for its informatization and involvement in electronic commerce,
- Insufficient coordination of private sector, scientific and educational institutions to comprehend necessary measures to stimulate better access to information by companies and easier access to Internet,

It is interesting to analyze the answers to the following question "To what degree does the current regulatory framework stimulate fair and transparent competition of a broad range of operators?", that were given by 68 BiH companies in 2004[69]. More then 66% answered "Little" or "Not at all", and only 7.2% gave positive answer ("fair amount" or "great deal"). This illustrates the perception of operators as business

[69] Field Research by UNDP and UNV, 2004.

enablers for BiH business. Companies do not believe that state regulates it well.

Overall Assessment of e-Business Perception

- Lack of information regarding suppliers and their products (for comparison)
- Most content in English
- Advanced web-services not available
- Lack of awareness of e-Business opportunities in the business
- Many years of command-economy created a mind set where people are not used to think independently and take decisions.

3.7.2.2. E-BANKING

Since the beginning of 2001 in Bosnia and Herzegovina ceased to exist Service for payment transactions, and all payment transactions were completely overtaken by the business banks. Central bank of Bosnia and Herzegovina linked banks in unique network for payment of medium risk level through two systems:

- Transfer clearing - links banks in computer network through which are payment data transferred (uses SWIFT MT100 message format)
- Real Time Gross Settlement System - RTGS based on use of SWIFT messages and standards

Access to the system have only commercial banks that obtain permission (from the authorized banking agency) to perform transactions of medium risk level and receive adequate requests set up by the Central bank of Bosnia and Herzegovina.

Centers for transfer clearing are in Banja Luka, Sarajevo and Mostar. Commercial banks in Bosnia and Herzegovina use both mentioned systems since it begun to function. They have SWIFT license that allows work in RTGS system and link with transfer clearing system is via Sarajevo and Banja Luka (Main branch of Central bank).

It is interesting to mention that Central bank of Bosnia and Herzegovina uses certificates with chip cards to send payment transactions in transfer clearing system.

It should be stressed that reform of payment system opened new segment of commerce and urged banks to fight for clients. Intensified competition between banks indicated on the need for more dynamic relations with account holders. Therefore, some banks decided to offer more of additional services to users to emphasize their comparative advantages in new environment. Consequently, development of electronic commerce and striving to ideal paperless commerce, with cut costs, presents, and will become an imperative for survival on the market.

Outcome of described approach is that authorized users receive information on current state and transfers of account (of internal payment transactions and payment transactions with other countries) and other banking information via:

- Internet page
- Electronic mail (internal transactions, S.W.I.F.T messages, statements for payment cards (VISA, MASTERCARD), exchange lists and general information and announcements are sent out)
- Interactive dialogue with computer through voice or fax message (current state, debt and claim transactions, reserved assets, general loans, etc)

e-Banking as a Service Provider

Oligopoly position of banks on Bosnia and Herzegovina market can be primarily measured by the following:

- High interest rates and rather bad payment terms for information equipment purchase loans,
- High prices of financial transactions set up individually by banks without government control, which is significant revenue for banks (2-2,5 million transactions per month only on Federation of Bosnia and Herzegovina territory) - cost of one transaction in electronic banking is up to ten times less than classical "paper" transaction, which could partly explain insufficient interest of banks to introduce provision of services via electronic banking;
- Insufficient readiness of banks to finance, that is, create development projects for economic entities and their information, and hence domestic banks keep significant liquid assets outside Bosnia and Herzegovina (upon some estimate over one billion KM);
- Insufficient bank readiness to invest necessary means into purchase of equipment, software and training of people to move to electronic banking - it results in only a few banks that have conditions to provide electronic commerce services;
- Small number of introduced electronic banking systems and its mutual inconformity, in other words, incompatibility due to the lack of coordination in equipment purchase and software solution;
- Cash payments are predominant;
- Basic bank services are not always accessible on satisfying level;
- Central bank of Bosnia and Herzegovina in some cases takes Parliament responsibilities in regards to the issuance of obligatory Instructions for commercial banks operation and it regulates issues of electronic commerce that normally should be regulated by law.

3.7.2.3. E-BUSINESS

The Overall situation can be described as follows:

- Lack of clear development strategy on state or entity level, lack of support measures to small and medium companies which are expected to be important carrier/factor of the country development;
- Insufficient information on advantages that information and electronic commerce offer in respect to the competition advantages and possible presence on global marketplace;
- Insufficient own financial assets to purchase and install equipment for electronic commerce.
- Unfavorable bank loan conditions for purchase of information equipment and unprepared banks to enter into the projects which upon their opinion are with high risk in regards to the rate of return;
- Due to the undeveloped financial market it is impossible to finance companies with venture capital which is, in developed countries, one of the basic ways to fund small and medium companies with emphasized orientation on e-commerce;
- Insufficient personnel qualification to adopt and utilize ICT equipment for e-commerce;
- Small number of companies uses Internet, mainly for communication with business partners , for browsing and collection of secondary data, while any form of on-line trade is rare. Positive example of the firm that strictly operate via Internet is the firm Interliber d.o.o, Bosnian Internet library with its headquarters in Sarajevo (http://www.interliber.com);
- Certain number of firms has its web presentations, but it should be stressed that it is beginning stage of web sites development and that

there is no clearly defined approach strategy and that data are not always up-dated regularly. As far as we are aware, very few of the firms have data on the number of their web site visitors which means that most of them lack the possibility to answer the question whether and in what scope they achieved goals of their presence on Internet;
- Small number of companies uses outsourcing, that is, specialized firms services for this sector. One such firm is BGM - Business Global Marketing (http://www.bgmdesign.com);
- Insufficient information of companies about the potential deliverers of suitable information and communication technology and characteristics of their possibilities as well as possibilities of specific adjustment of hardware and software solutions for needs of certain company.
- Lack of Internet portal for any business sector in Bosnia and Herzegovina.

3.7.3. CROATIA

3.7.3.1. ECONOMY AND COMPETITION

Increasing labor market flexibility

In order to enable monitoring of the effects of adjustment on dismissed workers, labor market information system has been developed and implemented.

The Government will expand the scope of labor market monitoring process by introducing continuous surveys on economic conditions and labor market conditions.

Sectored economic structure change

Information systems for small and medium entrepreneurship (SME). Due to GDP growth contribution, and the microeconomic structure of the economy, shown in the following tables, the importance of the information system on the national as well as interoperability with European Union SME systems is obvious.

Average rates of GDP growth.

		1996	1997	1998	1999	2000	2001	2002	Average growth rate
A + B	Agriculture + Forestry	1,4	2,3	5,6	-2,6	1,2	0,7	2,0	1,5
C + D + E	Mining + Manufacturing industry + Electricity Supply	4,4	6,9	5,8	3,0	3,4	4,8	4,0	4,6
F	Constuction	18,8	13	0,5	-10	-7,1	2,3	13,9	4,0
G	Wholesale and retail trade, repairs of motor vehicles and motorcycles and household goods	15,6	13,7	-0,8	-11,2	4,0	10,6	12,7	6,0
H	Hotels and restaurants	21,8	18,1	0,7	0,0	15,7	5,7	7,5	9,6
I	Transport, storage and communications	7,0	3,5	4,3	-5,1	4,5	6,9	6,8	3,9
J+K	Financial intermediation, real estate, renting and business activities	2,1	5,5	4,0	3,8	0,4	4,0	6,4	3,7
L+M+N+O+P	Public administration and defence, compulsory social security, health and social work, other community, socia and personal servise activities and private households	1,9	3,0	2,6	3	1,7	0,2	0,2	1,8
	Indices of real GDP growth	5,9	6,8	2,5	-0,9	2,9	3,8	5,2	3,7

SME	number	% in no. of companies	no. of employees	share in employ.
Crafts	100,532	61,8	241,714	23,7
Co-operatives	795	0,5	4,293	0.4
Microcompanies	49,534	30,4	116,431	11,4
Small companies	9,561	5,8	140,602	13,8
Medium - sized c.	1,845	1,1	167,336	16,4
Total SMEs	162,267	99,6	670,376	65,7
Large companies	720	0,4	350,617	34,3
Overall economy	162,987	100,0	1,020,993	100,0

Source: Croatian Bureau of Statistic

Because of the economic growth in the period from 1997 to 2002, most new jobs were created in the following sectors: construction, business services (Financial intermediation, hotels and restaurants and trade). Other sectors, however, while they did record growth in the period under review, experienced a decline in employment because of technological restructuring (increased productivity).

SMEs account for 99.6% of all companies and provide employment to 61.1% of all employed persons in the Croatian economy. Their share in GDP is estimated at 55%, and they contribute about 25% to total exports.

The above data refer to 30 June 2003 (sources: Croatian Bureau of Statistics, Financial Agency FINA, Croatian Chamber of Commerce, Croatian Institute of Health Insurance, Crafts Register with the Ministry of Small and Medium Enterprises).

Initiatives taken to enhance the business environment

- Investment Promotion Act adopted in July 2000.
- Trade and Investment Promotion Agency established by regulation in August 2002. Recently at the start up phase.
- FIAS - in May 2000, Government of the Republic of Croatia has started with project of eliminating administrative barriers to investments in the Republic of Croatia with assistance of Foreign Investment Advisory Service (FIAS), a Joint Service of International Finance Corporation (IFC) and The World Bank (IBRD). The investigation breaks the investment process into four generic areas: entry procedures (immigration procedures, work permits, and related procedures for foreign investors and expatriate workers); business establishment (company registration and various licensing procedures for all investors, both foreign and domestic); locating procedures (land acquisition, land registration and construction); and operating (paying taxes, import/export procedures, inspections, and other routine interactions between business and government agencies during normal business operations).
- Trade integration with the EU (Certain positive indicators that announce the increased share of products with a higher percentage of added value or capital or technologically intensive industry have been observed in the past three years, but still not in terms of the value of exports and not in such a way as to cause a significantly influence the structure of exports. These positive developments i.e. the increase of the share of technologically better processed products can be noted in the following groups of products: electrical machines and tools, medical products and the like, gauging instruments and devices, office machines. A more significant change in the structure of Croatia's export to the European Union is to be expected after the changes in the structure of Croatia's processing industry will have taken place. These changes will result in an increased share of capital and technologically intensive industry i.e. products with an increased share of added value).

Economic environment for long lasting sustained economic growth

Croatia supports a long lasting sustained economic growth by means of intensive investments in infrastructure (roads, motorways, gas and oil pipelines, railroads and housing construction), as well as through special programs stimulating employment and tourism industry. Revenues of the state budget derived from privatization are not intended for current expenditures, but are directed into infrastructure investments and entrepreneurship support programs. Moreover, Croatia is aiming at providing a convenient environment for attracting foreign and stimulates domestic investments by means of reform of the judiciary system, changes of tax legislation and removing administrative barriers. The simplification and acceleration of registration of small and medium enterprises, more agreeable financing (loans, government guarantees, subsidizing interest payments), as well as tax relief for self-

employment and establishing small enterprises stimulate the development of small and medium enterprises.

Since the beginning of 2002 the Stabilization and Association Agreement is applied, and since 2003 Croatia is a full member of CEFTA. Along with the membership in the World Trade Organization (WTO), Croatia has signed a number of Free Trade Agreements, which will enable the Croatian export companies to considerably increase the market for the sales of their goods. The process of harmonization of Croatian acts and regulations with the European Union standards.

Croatia's GDP, after the decrease of 0,9% in 1999 is now on the increase for fourth year in a row; in 2000 the growth rate amounted to 2,9%, in 2001 GDP increased by 3,8%, in 2002 5,2 %, whereas in 2003 an increase of 4,5% is expected.

The economic growth is realized through maintaining the inflation rate at a very low level (2,3% in 2002 and approximately 3,0% in 2003).

Considerable tax and tariff reductions on investments, as well as technological modernization of manufacturing facilities in the last two years have contributed to an increase in the rate of capital goods import (machinery and equipment), opposed to the increase of the export of consumption goods, which was predominant before.

The growth of the GDP has started to show its effects on the labor market through changes in the employment trend. In 2002, for the first time since the mid-90ies, a reduced unemployment rate has been registered on the annual basis. Since April 2002 the unemployment rate has been decreasing constantly. By the end of July 2003 it amounted to 18,5 % (the lowest unemployment rate since December 1998). In sense of the EU directives, the Republic of Croatia is planning to devise annual employment programs and at the same time continue to implement an active employment policy, especially in relation to young people, women and people living in Areas of Special State Concern.

Changes accomplished in the labor legislation will contribute to the increased flexibility of the labor market, which will, in turn, result in an increased mobility and fluctuation of labor force. The reforms of education and science are expected to increase the value of human capital in the long run.

The government of the Republic of Croatia has determined the basic strategic challenges and answers to the economic policy in the next ten or so years in the Development Strategy of the Republic of Croatia "Croatia in the 21st century"- "Macroeconomics", a document that has been deliberated in the Croatian parliament as well (Official Gazette, 145/2002). According to the Strategy, GDP per capita in the following decade should be doubled in relation to the figures from 2001, and unemployment reduced to half along with maintaining a stable macroeconomic framework. In keeping with the Strategy, the government of the Republic of Croatia has outlined tasks, guidelines and measures of the economic policy which form part of the Memorandum of Economic and Fiscal Policy signed between the government of the Republic of Croatia and the International Monetary Fund in December 2002, as well as of the Fiscal projections for the period 2003- 2005 adopted by the Croatian Parliament on the occasion of the budget adoption of the Republic of Croatia for the year 2003.

Competition environment

Competition Act adopted by the Croatian Parliament on June 15th 2003, and in implementation from October 1st 2003, (Official gazette No 122/03), has not been limited only to the practices within the territory of the Republic of Croatia but it also includes practices, which although they are performed outside its territory, have an effect in the territory of the Republic of Croatia. In accordance with Article 2 of the Competition Act, it shall apply to all forms of prevention, restriction or distortion of competition within the territory of the Republic of Croatia or outside its territory, if such practices have an effect in the territory of the Republic of Croatia. According to Article 3 paragraph (3) the Competition Act shall apply to legal and natural persons that have their seat and permanent residence abroad, provided that their participation in the trade of goods and/or services affects the home market. For the Competition Act, as well as the Table of Concordance of the Provisions of EU Legislation with the Competition Act.

Exceptions regulated by separate laws relate to sectors of the economy partially excluded from the application of the Competition Act. In these sectors separate laws regulate the establishment of separate regulatory bodies competent, inter alia, for competition issues. These are, for instance, the Telecommunications Act (Official Gazette122/03); the Banking Act (Official Gazette 84/02); the Securities Market Act (Official Gazette 84/02); and separate regulations in the energy sector (the Energy Act, the Electricity Market Act, the Act on Petroleum and Petroleum Products Market, the Gas Market Act, the Act on Regulating Energy-Related Activities, all published in the Official Gazette 68/01). However, the above regulations do not cover comprehensive competition in these sectors, they supply certain provisions and particularly or additionally regulate definite competition issues. The Competition Act is, on the grounds of the above mentioned, lex generalis and the main source of competition law for the activities laid down by these regulations.

State owned companies

Following public undertakings became exclusive property of the state, specifically: "Narodne novine" d.d. (Official Gazette Company), "Hrvatske šume" (Croatian Forests), "Jadrolinija", "Hrvatska vodoprivreda" (Croatian Water Supply Company), "Hrvatske ceste" (Croatian Roads), "Hrvatska elektroprivreda" (Croatian Electric Company) , "Hrvatska radio televizija" (Croatian Radio and Television), "INA" (The Oil Industry) and "Hrvatske eljeznice" d.o.o. (Croatian Railways).

Modernization and reconstruction of ICT as the enabler for the business reengineering focused to business interoperability is strong ongoing process.

State monopolies

By the end of 2003 Hrvatska pošta ("Croatian Post Office") had the monopoly in the postal sector. Postal Act anticipates the abolition of the monopoly of Hrvatska pošta, except for certain services. By this legal act, the normative solutions in the field of postal services and postal transport will be adjusted to the requirements of the European Union.

Although there are no legal limitations to access to the market of fixed telephone networks, Hrvatske telekomunikacije d.d. ("Croatian Telecommunications, Inc.") still preserve the monopoly over the unbundled local loop that will cease on 1 January 2005. After that date, Hrvatske telekomunikacije will be obliged to enable access under market conditions to other interested providers of telecommunications services and provide the service of transferability of numbers and preliminary selection of operator.

The only company in the railway transport system is "H - Hrvatske eljeznice d.o.o." is state owned company.

3.7.3.2. FINANCIAL SECTOR

Financial markets

General characteristics:

- Interest rates are generally market-determined
- State and private sectors have access to the international financial markets on market terms
- Timely inefficient implementation of Bankruptcy Act

The banking sector

The Croatian banking sector was consolidated in the period from 2000 to 2002. During the consolidation process, foreign banking groups (mainly Italian, Austrian and German) acquired majority stakes in the share capital of major, as well as some minor Croatian banks. The Croatian banking sector includes 42 banks, some of which belong to the six (6) banking groups.

Competition in the banking system is well developed.

By the end of 2002, the market leader was Zagrebacka banka with a share of 26.5% in total bank assets (Zagrebacka banka d.d. Group share amounts to 28.9%), a member of the UniCredito Italiano Group, followed by Privredna banka Zagreb with a share of 17.6% in total bank assets (Privredna banka Zagreb Group share amounts to 20%), a member of Intesa BCI Group.

Regulatory environment

The Securities Market Act came into force on 25 July 2002. Act regulates the establishment, scope and responsibilities of the Securities Exchange Commission of the Republic of Croatia, the procedure for issuing securities, securities transactions and persons authorized to conduct securities transactions, the conditions for securities trading in regulated public markets, the protection of the investor and the holder of rights derived from a security, dematerialized securities and the organization and powers of the central depository agency, stock exchanges and regulated public markets.

Act on the Takeover of Joint Stock Companies came into force on 25 July 2002. The Act lays down the conditions for making take-over bids for joint stock companies, issuers, and the takeover procedure, and regulates the rights and obligations of participants in the takeover procedure and supervision of a joint stock company takeover procedure.

The Investment Funds Act came into force on 4 January 1996 and as amended on 2 December 2001. The Act lays down the conditions for establishing investment funds and investment fund management companies and regulates their business operations.

Equity, bond, money markets

The equity market is underdeveloped for several reasons. The model of privatization as used in the country did not promote the development of the capital market and the tendency to increase capital based on debts and bank loans is still a part of business mentality. Bad experiences in early 90's in connection with pyramid schemes and various types of financial engineering have contributed considerably to strong resistance on the part of investors, to investment in financial instruments. Finally, the lack of domestic savings and limited free reserves hardly contributed to vitality and liquidity of the country's capital market.

The domestic corporate bond market is also undeveloped, yet some positive trends are discernible. Bonds are usually traded between institutional investors, including funds, pension funds, banks, insurance companies and legal persons authorized by the Commission. Trading takes place on the markets and on the inter-bank market.

The HRK deposits market mainly comprises inter-bank trading in deposits with very short maturities, partly conducted in the Zagreb Money Market, the institution combining supply and demand, and partly in the direct inter-bank market.

Non bank financial institutions

Legal framework governing insurance, insurance mediation and representation is provided by the Insurance Act, Act on Mediation and Representation in Insurance, the Obligations Act in the part that relates to insurance issues, Maritime Code in the part that relates to marine insurance and implementing regulations issued on the basis of these Acts.

The amendments planned to the legislative framework in 2004 regulating insurance, pursuant to the Stabilization and Association Agreement, are in line with the measures laid down by EU Directives governing insurance.

The role of the Financial Agency (FINA)

The role of the Financial Agency (FINA) is defined by the Financial Agency Act Official Gazette, No. 117/2001), which revokes FINA's previous powers within the payment system and authorizes it to perform payment system operations only as a third party, in the name and for the account of banks.

Act authorizes FINA to perform the activities related to the operational management of the National Clearing System (NCS), distribution and handling of cash in the name of the Central National Bank (CNB), to maintain the national system of digital keys issuance - Register of Digital Certificates, and other public and commercial registers. FINA also provides the IT-support to the State Treasury system and the Central Register of Insured Persons (REGOS), and collects and processes certain statistical data for the purposes of the Government.

3.7.4. MACEDONIA

Due to the small penetration of the Internet among the citizens in Macedonia the requests by the citizens for e-business and e-commerce solutions is very low, and because of the low demand there is a small number of companies offering on-line services for their users. No accurate data is available on how many companies have their own web presentations, nor how many of them are offering on-line sale of their products. Several hundreds updated business web sites in Macedonia mainly offer a simple static promotion of their businesses, while those going one step further are not given legal possibility to wrap up one whole cycle of electronic payment, because the Electronic Signature Law has not been implemented yet. The users from the country shopping on Internet are mainly buying products from the foreign web sites that can easily be transported and cost a little money (books, music CDs etc.). From the local offer there are services for development of classical web presentations and Portal solutions, Content Management systems, products and services catalogs, systems for offer, e-banking

solutions, which are in their starting phase. Some banks providing Internet electronic keys for their clients, facilitate online review of the state of their accounts, as: Stopanska banka (www.stb.com.mk), Komercijalna banka (www.kb.com.mk), to the possibility offered by Tutunska banka (www.tb.com.mk) for conducting on-line transactions in the domestic and foreign payment operations through Internet. Still, at the moment B2B segment is on very low level and it is only available as a provision of a price lists, information and prospects for business partners and associates. In regard to this, there are several business portals, out of which we would point out the one on www.seebiz.net.mk and the portal of Trade Point (www.eurobc.com.mk), which, on their own way, offer information and tools for improvement of the way one business is led, as well as contacts and promotion of the companies locally and internationally through the efficient use of advanced information technology and trade-related services.

Still, the main obstacles for faster development of e-business in Macedonia at the moment are as follows[70]:

- Market
- IT investment in still regarded as an expense in Macedonia,
- Poor competitiveness of Macedonian SMEs
- Bad economic situation and small and unstable market
- Low level of awareness for the potential and the possibilities of IN by the managing personnel of SME's
- Educational system
- Lack of quality
- IT educated personnel with low business skills
- Government
- Low level of investments in the public sector
- Low level of competitiveness
- IT Sector
- Unknown resources of the companies
- Undefined standards for IT performances, measures and comparable criteria
- Lack of cluster relations within the frameworks of the IT sector, as well as between the rest of the industrial branches
- Poor cooperation with the government and the rest of the businesses

At the moment in Macedonia there are several new beginnings in regard to the usage and application of M-commerce solutions mainly in the purchase of Internet subscription time by sending SMS messages, and there no indications whatsoever for the usage of the mobile phones "Small Payment".

In regard to the computer usage in the companies, 88.2% of the asked companies are using computers for the finances, while 82.4% of them are using computers also as a tool in some phase of the production process. 66% of the asked companies are using professional consultative services of other organizations in regard to the usage of the computers, e-mail and Internet.

The companies are not familiar with the Information Society concept, neither with the eSEE Agenda, and only 18.2% of them have heard about some Regional Guidelines for National Information Society Policies (NISP).

3.7.5. MOLDOVA

3.7.5.1. TYPES OF ACTIVITY

In primary statistical documents this sphere is not separated, which makes it difficult to analyze the state of the matters in e-business in Moldova. Analysis can be done only on basis of some special research and, indirectly, using some indirect official statistics. This analysis requires considerable efforts and in existing circumstances will hardly improve results of a more general analysis, because it is clear right from the beginning that the matters in this sector are just at the initial stage [3].

The following are classified as e-businesses in Moldova:

- B2B electronic financial transfers;
- Electronic payments - payment for goods and services by means of cards and point of sales terminals (POS) installed in large shops and with some businesses of other specialization;
- Automatic disbursement of cash by means of bank cards and ATMs;
- Online account statements for the customers;
- Online advertising of products and services using web-technologies, etc.;
- Access of Moldovan users to web sites that practice e-commerce on global Internet;
- e-commerce opportunity for Moldovan users, using the telephone access installed for the purpose in some countries (for instance, in the USA, Japan, Great Britain). This is the way people usually buy software, books, electronic items, etc.

Use of information networks for mediation of businesses in Moldova started first in the banking sector. It is natural, because e-business activities normally require online payments. Such payments are done through electronic payment systems, normally managed through banking system. As well, the economic situation of the banking system in the country is much better compared to other sectors. The banking system today is still the one to hold the largest share of e-business in the country.

3.7.5.2. INFORMATIZATION OF BANKING SYSTEM

Banking system in Moldova employs 16 commercial banks with a network of 140 branches and 410 agencies (www.bnm.md). In 1995, the National Bank of Moldova (NBM) introduced basic international banking standards, and by 1997 it had concluded the process of adaptation to these standards of the entire banking system in the republic. This, and connection to the SWIFT system in 1996, enabled adequate integration, by 1997, of the Moldovan banking system to the international one.

Integration with the international banking system implied usage of modern payment instruments, i.e. electronic payment systems. A greater part of the world e-business transactions is done by means of bank- cards. To ensure procedural conditions for use of electronic payment systems, the National Bank of Moldova approved Regulations No. 58/11-02 of May 25, 1997 on organization of bank- card payments in Moldova, and Regulations No. 404 of December 25, 1998 on serialization of cards issued by the banks authorized by the NBM. Further development of bank- card payment services demonstrated urgency of the mentioned procedural documents.

The NBM is the owner and manager of an inter-bank payment system, which also executes electronic credit transfer, both on behalf of the banks-participants and their customers. Referring to the card payment systems, the NBM assumed the role of a general regulator of

[70] Petar Indovski, Vice President of MASIT, in his presentation "Development Perspectives of e-Business in Macedonia and role of MASIT", e-Business Conference, Skopje April 2004

development and supervisor of observance of consumers' rights, by working out regulations, analyzing risks and trends and executing specific audits regarding application of the procedures. Another important function of the NBM is final account, employing the inter-bank system of payments, of commercial bank's daily account statements registered as proceedings of card transactions carried out in the Republic of Moldova by the residents.

Non-cash bank transactions by legal entities take place in Moldova, as a rule, through a credit transfer that the payer first endorses on paper. Most of non-cash transactions by individuals take place through debit bank- cards. Bank- cards are another retail non-cash payment instrument. Development and administration of retail payment systems is the prerogative of commercial banks. Emission of bank cards in the country started in 1997, when commercial bank Victoriabank became member of the Visa International payment system. Moldova uses both one emitter's card payment systems (international payment systems using Visa International and Union Card cards, and the local payment system using DecartMediaPay cards), and two payment systems using cards with many emitters:

- Local payment system using cards with microprocessor "Moldcardsystem";
- International payment system using cards with magnetic band Europay International.

Collection of transactions in the system "Moldcardsystem" is made by each bank-emitter from its distributors. Each bank separates transactions made with its own cards, fills in and makes exchange of transaction files with other banks participants in this system. Based on the total amounts in transaction files received from other banks, each of the banks participants makes a hard original of credit transfers which it sends for final and irrevocable settlement to the NBM through the electronic inter-bank system of credit transfer.

In what regards international payment system using Europay International cards, it was joined by eight Moldovan banks in 2000. This system ensures collection of transactions in national currency made by using cards emitted by local banks at the Central European processing Center through local processing centers. Europay cards processing capacities are ensured by two local processing units:

- A processing center with a commercial bank certified in 2000 by the Europay;
- The Processing Company "MOLDMEDIACARTELÃ" s.r.l. (a non-banking institution), founded by five local commercial banks.

A few banks run their own networks of ATMs (Moldova Agroindbank, Banca de Economii, Victoriabank, Banca Sociala, Mobiasbanca, etc.) and POS terminals. By March 1, 2001 there were 200 POS terminals installed on points of sale; in addition, there was a network of 14 ATMs.

After the first launch of electronic payment systems, there have been made certain improvements as well. Thus, to facilitate the process of financial communication with customers, a number of banks implemented electronic systems "Customer-Bank". The project "Two cards per one bank account" enabled the holders of VISA cards to get Europay cards, both of them being linked to the same account of the card holder. "Moldcardsystem" implemented a project, the idea of which was to install an application of commercial card on a regular debit card with microprocessor. Thus, holders of such cards, in addition to a regular debit card application that allows executing payments through POS terminals, received a possibility to purchase fuel for their cars from the network of gas stations belonging to the company that was indicated on the card, to which they had to make an advance payment through banking system.

3.7.5.3. STATISTIC DATA

The amount of payments made in 2003 by using bank cards reached 8.7% of the retail sale and paid services offered to the population. Although the percentage is small, an analysis of card payment services demonstrates that this sector develops fast. For instance, on December 31, 2002 there were only 148,000 cards emitted by the commercial banks authorized by the National Bank of Moldova, which is by 2.9 times higher compared to December 31, 2001. On May 31, 2003 this number reached 192,000 and on October 1 of the same year it was over 350,000. As well, the number of transactions carried out in 2002 in the Republic of Moldova using bank cards emitted by the commercial banks authorized by the NBM grew by 2.9 times compared to 2001, and their total value grew by 3.4 times. Similarly, the number of transactions carried out in 2002 in the country by using bank cards emitted abroad grew by 2.0 times compared to 2001, while their value grew by 1.7 times.

According to the data provided by the National Bank of Moldova, in the first semester of 2003, the use of bank- cards is characterized by the following:

- Total number of cards in circulation as of May 31, 2003 - 192,000, of which 8,500 (4.4%) were local cards;
- Total transactions - 1,6 million, of which 33,000 (2.1 %) used local cards;
- The total value of transactions - 980 million lei, of which only 87 million lei (8.8 %) were non-cash, the rest being operations of cash withdrawal;
- Number of banks (of the 16 universal commercial banks) that implemented use of cards - 11, of which 2 under MoldCardSystem, 4 under Visa International and 11 under MasterCard International.

As of October 1, 2003, there were eleven banks in Moldova that were emitting plastic cards, including Visa and MasterCard. A steady growth of turnover in this sector proves that the citizens in this region are more actively involved in use of plastic cards not only to withdraw cash, but also to pay for goods and services. Just four years ago, card payments were accepted only by five enterprises; today a card- holder can use it in over 300 shops and service centers.

According to the National Bank of Moldova, during nine months of 2003 Moldovan banks emitted 75,000 bank- cards. As of October 1, the number of cards in circulation reached 350,000. The volume of transactions with the bank- cards emitted in Moldova and carried out in the country, during nine months of 2003, equals 1.1 billion lei. In addition, as reported for these nine months, the volume of transactions carried out in other countries and involving cards emitted in Moldova equaled 102.7 million lei, and the volume of transactions carried out in Moldova involving cards by foreign emitters equaled 281.5 million lei.

A number of companies launched web-site projects, where they published information on their products and services. There are also a number of electronic shops, though they are just at their initial stage of development, among which:

- www.produse.md launched on September 3, 2002;
- http://www.imobiliare.md - real estate offers. A service where registered users can quickly publish an announcement and these announcements are available to anybody to enable an easy search and choice. Though announcements come from different sources,

they have a common format that facilitates reading and search; they include price and other additional information that are offered by those who publish them. Using real estate services.md the customers take advantage of:

- ü A database with real estate offers at the national level;
- ü A powerful search engine to look for real estate offers by multiple criteria;
- ü World Wide accessible site - at the international level;
- ü Access 24 h a day, 365 days a year.

· www.e-centru.md - eCentru - is a gateway of e-Commerce, launched on September 1, 2003. The S.A. "ECENTRU-COM" (Joint-Stock Company) exists since 2001 and provides various e-business services. The first in Moldova international gateway of e-commerce eCentru - is a web site for Internet-shop. It offers the sellers, fast and with minimal investment, everything from an Internet-shop window with a detailed catalogue of goods/services to an elaborate Internet-shop with acceptance of online payments. The buyers may benefit of convenient and safe purchases via Internet by using their plastic cards. Services:

- ü Smart-site - a multi-functional web-site,
- ü Internet-shop window - Smart-site with a catalogue of goods/services,
- ü Internet shop - Internet-shop window, connected to the system of Internet payments,
- ü e-business solutions - individual complex e-business solutions.

· http://www.acorex.net/ Company JSC "Cricova-Acorex", Production and sale of wines on the local and outside markets. No bad site.

· http://www.e-centru.md/sanin/main.aspx?dbID=dash_Home "SANIN" Company - a Moldova-Israel company dealing with production of tape and elastic package materials.

· http://www.e-centru.md/revel/main.aspx?dbName=Catalog - an e-shop of the Revel Computers Company with almost all functions, including online payments.

Most transactions took place in ICT sector - 54%, which can be explained by the fact that those who are engaged in this sector are better informed, and have more confidence about the possibilities of the system.

3.7.6. SCG - KOSOVO

The business environment in Kosovo is regarded better than in many transition economies. The recent Investment Climate Survey found that domestic and foreign investors generally regard the business environment as positive. A relatively strong legislative foundation for a market economy is largely in place. Most firms indicate satisfaction with macro-economic stability, labor regulations, skills of the workforce, and administration of business licenses and operating permits. While at the operational level the unreliable electricity supply is a key problem, continuing uncertainty about final status continues to deter investment and business growth. (World Bank: Transitional Support Strategy for Kosovo, March 2004)

The e-Business in Kosovo didn't take off yet, due to a complex of correlated factors including ICT Infrastructure, legal framework for e-Business, banking system, lack of foreign investments and lack of tax incentives for local businesses. It goes without saying that vast opportunities for businesses and for their customers are wasted and continue to be overseen by both the regulatory bodies in Kosovo; by non providing the stage for e-Business and the business community; by not undertaking a serious push in this direction.

Meanwhile, select local ICT and software development companies are demonstrating respectable capacity to support the growth of the e-Business sector in Kosovo once minimal preconditions are in place.

Banking and payment system

The e-favorable banking system, fostered by a legislative framework, given the minimal ICT infrastructure preconditions are existent, can have a significant role in any serious take-off of the e-Business in Kosovo. The stage of the banking system today together with the lack of e-Commerce legislative framework can be considered as the determinants of the e-Businesses situation in Kosovo. Again, the most illustrative example of the state of the e-Business in Kosovo can be observed through its banking system

One of the first big successes after the conflict was the rebuilding of a sound and efficient banking system, based on the prudent principles of international banking. After a decade of mismanagement of the fiscal system prior to the war, it took excessive and sustained efforts to gain back the confidence of the people into the banking system. It has to be honored here that this would not be possibly achieved without the direct support of foreign agencies, in first place, the USAID and EAR.

The Banking and Payments Authority of Kosovo (the "BPK") is performing the duties of the Central Bank of Kosovo. It is a distinct public entity with the authority to license, supervise and regulate financial institutions in the territory of Kosovo. The BPK was established in accordance with the provisions of the United Nations Interim Administration Mission in Kosovo ("UNMIK") regulation no. 1999/20 issued on November 15, 1999 (as amended on October 1, 2001). Under this regulation, the BPK's principal objectives are to: "Foster an efficient and safe system for domestic payments". Among others, the BPK has the following specific powers to: "Recommend

Following table summarizes web addresses and website services offered by Kosovar Banks.

Bank name	Web address	Website services
ProCredit Bank	www.procreditbank-kos.com	Information (comprehensive)
BPB - Banka e Biznesit Privat	www.bpb-bank.com	Information, marketing
Banka Ekonomike	www.bankaekonomike.com www.bekonomike.com/	Presentational style web page. (uncompleted)
BKP - Banka Kreditore e Prishtinës	www.bkpbank.com	Under construction
KASAbank	www.kasabank.com	Information, marketing
BRK - Banka e Re e Kosovës	www.brk-bank.com	Info, marketing, pricelist for services,
Raiffeisen	www.raiffeisen-kosovo.com	Info., marketing, instructions for opening accounts, etc.

Do the existing ICT policy and strategy enable maintenance of competitiveness of domestic IT products? (D5BQ21)	
Yes (%)	18.0
No (%)	41.0
Do not know/no answer (%)	41.0
Total (%)	100

broad policy guidelines...". (See: BPK, www.bpk-kos.org/english/functions.htm). Yet, there is no mentioning of the word "e-Banking" or "on-line" in the BPK's 2003 annual report. In addition, there are no serious undertakings by BPK in its role as a Central Bank of Kosovo to help and lead in resolving the issue over the SWIFT code for local commercial banks in Kosovo.

e-Banking

Using electronic delivery channels for banking services has been introduced recently in Kosovo and is still gaining in momentum. These services consist mostly on cash withdrawal from ATMs and limited availability of Point of Sale Terminals (POS).

The dependence on technology for providing the e-Banking and e-Business services in the environment of underdeveloped ICT infrastructure in Kosovo has been an important factor to limiting the wide- spreading of these services. The additional security risks and the costly update of the Information Systems had been and continue to be a challenge for Kosovan Commercial Banks as well as for e-Businesses development.

Most of the banks in Kosovo, including the BPK, have had to switch from their initial legacy systems to a more standardized MIS during the 2003. The current systems used in BPK are FreeBalance, FlexCube (accounting), and various legacy systems. Several commercial banks in Kosovo have also switched to using i-flex solutions FlexCube (www.iflexsolutions.com/flexcube).

In Kosovo, currently there are only two commercial banks to offer the electronic services to end costumers, the ProCredit Bank and Raiffeisen Bank. ProCredit bank is the first licensed and the largest bank in Kosovo. It has been pioneering and fostering POS terminals and ATMs. Currently, it reports to have achieved a total of 86 Merchants with POS terminals and 25 cash machines that are spread throughout Kosovo's main cities. This bank is the first one to issue debit and credit cards. Maestro is a commercial name for the debit card issued by this bank. ProCredit Bank offers this card to all clients free of charge, i.e. no annual fee is required. Cardholders can use the ATMs at ProCredit Bank Kosovo's branches free of charge. Transaction-based fees will apply when offsite ATMs or other banks' ATMs are used. For a MasterCard (credit card), an annual fee of EUR 20 plus additional transaction-based fees will apply. (see: ProCredit Bank, www.procreditbank-kos.com/en_cards_products.php?gjuha=english).

The Raiffeisen Bank is the second and the last bank that has its ATMs installed in Kosovo. None of the banks in Kosovo has a website that offers on-line transaction banking services.

e-Business

The number of businesses that offer various on-line services is increasing daily. However, their business model is usually complemented by hardware products & services and traditional brick-and-mortar businesses models. The on-line component is used mostly for marketing purposes. It is encouraging that the awareness for the benefits of complementing the business with on-line component (see local car dealer at: www.autoshkodra.com) or even going completely on-line is rising among the business community in Kosovo. As of now, there are businesses that could easily go completely on-line, provided there is a sound on-line payment system and security in place. (i.e. see: MCM, www.mcmtravel.com)

It is unrealistic to expect on-line business to flourish in the environment where the payment system doesn't provide for card payments. Though huge efforts have been invested to reduce the cash circulation, this far, the non-cash payment has taken sound ground only in Inter-banking Clearing System (ICS). (See: BPK, Inter-Banking Clearing System, www.bpk-kos.org). The complete design, development and implementation of the ICS were completed by a local company, (www.dardaniaonline.com/pronet/eng/info.shtml).

The electronic delivery channels can help economic growth by increasing transparency and leading to higher competition among businesses, and most significantly - through lower costs, penetration into the new markets and expanding the geographical reach. The non-cash payment can be effective measure against the traditional gray economy in the area. To achieve this, the most important players in this direction, the tax regulators, should provide incentives for businesses to go on-line.

It has to be noted here that the current tax system in Kosovo does not provide incentives for development of any particular economic area. This is a flat tax system that, combined with the unilateral and ambiguous interpretation of the pre-war laws for importing gods from ex-Yugoslav countries, has brought the local economy to a collapse.

Do the existing ICT policy and strategy improve foreign direct Greenfield /Brownfield investments in IT sector, and in what way (D5BQ22)		
	Greenfield investment	Brownfield investment
Yes (%)	9.8	6.6
No (%)	47.5	62.0
Do not know/ no answer (%)	42.6	30.0
Total	100	100

The "Survey of 300 enterprises in Kosovo" (Feb 2003), showed that unfair competition on the domestic market is a major issue for many enterprises. This was the second most pressing problem ranked just after that of electricity supply. (http://pbosnia.kentlaw.edu/projects/kosovo/econ_development/survey%20of%20300%20enterprises%20in%20Kosovo.pdf, Survey of 300 enterprises in Kosovo, February 2003).

Field research "ICT Country Status Report survey" (March 2004) indicates that the business sector in Kosovo has little faith (9.8%) in existing ICT policy and strategy to improve either Greenfield or Brownfield direct foreign investments in ICT sector in Kosovo.

Similarly, only 18% believe the existing ICT policy and strategy enables maintenance of competitiveness of domestic IT products.

3.7.7. SCG - MONTENEGRO

Modern business practice requires the use of ICT, and there is some awareness within Montenegro concerning the importance of ICT within a business setting. However, a view of ICT as essential to both good organization and proper business conduct is not widely held within Montenegro.

There is interest in the potential of the Internet and ICT in business, but this concept is not priority. A number of firms have the opinion that a web presentation is an expensive and uncertain investment.

There is no e-business in Montenegro.

Banks in Montenegro haven't yet implemented developed e-banking solutions. The banking information systems in Montenegro are still in the phase of transaction, but there are few steps of this process: banks as a part of SWIFT network, the use of credit cards in payment and through the bank cash machine.

The number of issued credit cards in Montenegro is about 49.500, the number of bank cash machines are 23 and the number of automated selling place are about 760.

The average salary of ICT experts is 700 €.

In accordance with the research of private companies, are following data	80% use computers in their work; 10% have employee in charge of IT activities; 30% have a web site, merely advertising and the site is infrequently updated Their opinion is that there is no Government initiative in development of ICT in private sector; Only 10% of using computer is in production and 90% is using for documents, bookkeeping and Internet search. There are no training for using computers, employees are mostly self educated.
In accordance with the research of state enterprises, are following data	Every company has developed IT sector and team in charge of IT activities; If there is need, computers are used in production process. There are training and special courses for employees in accordance with their obligations and responsibilities.

3.7.8. SCG - SERBIA

The climate for e-business in Serbia is somewhat disappointing compared with other countries in the region. E-commerce infrastructure is neither established nor regulated by relevant laws.

ICT is not effectively incorporated within the internal process of the companies, following the business demand. Business is still mostly conducted via telephone, faxes and in person. Some business activities are completed via e-mail (specification, ordering etc).

Many computers are internally networked for data processing, reporting, and or/and enterprise applications. Some of the employees use email for communication, but this is not a standard.

The mostly used software applications are Microsoft Office, especially World and Excel. The issue with these applications is that they are not localized in Serbian, thus end users are utilizing only a handful of options.

To qualify the readiness of various organizations to introduce e-business we can use the following indications based on research results (Josanov, B)[71]:

- The experiences in computer network use exist, but it is extremely small number of established electronic exchanges of certain business data structure.
- There is a small number of users that actively use existing X25 and X400 network connections.
- The only more important experiences are made in electronic funds transfer and are related with the use of network for national payment transfer, while banks have experiences in SWIFT network use for international payments.
- It has to be mentioned that the use of these networks is almost in all cases completely out of existing information systems.
- The standardization and opening of these systems towards the potential electronic contacts are rare and sporadic, but important thing is the existence of the knowledge that they are the necessary pre-condition for the relevant e-business system development.
- Information systems in Serbia are relatively simple and they are used in a traditional way, followed by a constant work of experts for information technologies on maintaining and development.
- These systems are projected as closed systems, so as a rule they rely on their own classification codes.
- Projected security is very often on minimal level.
- The use of standards in their development is rare and those are mostly unique systems.
- Information systems are applied in almost all segments of work with most users, and they very often use a unique system of data, usually centralized database, with real time maintenance. In most cases, their documentation either does not exist, it is not up-to-date, or it is not centrally organized.
- The better state of information systems is found in banks, insurance companies and large productive organizations, and the lowest level of information systems are found in SMEs. This conclusion should not be taken for granted, because SMEs are the most efficient in changes, when needed. The information systems of trade and logistics organizations demand most investments.
- Logistic decision-making systems are not included in our information praxis and the knowledge about these systems is on very low level. The results of this survey indicate that this segment, as well as the standard implementation and the level of overtaken safety, are the weakest elements in our information praxis.
- Private sector, although mostly with low level of their existing information systems, is more flexible and oriented on changes and new technologies.

In general, current e-commerce level in Serbia is characterized by:

- e-commerce is still at its beginning,
- Internet does not have a real business character,
- Most of the firms use web sites for fashion, not for communication with their partners,
- About 2000 firms in Serbia & Montenegro use their web presentation for marketing and very rarely for ordering and commercializing,
- Having a web site is a matter of image, not necessity.

In February 2003, one research found 16.538 Web sites in Serbia & Montenegro, but only small part of them is used for the exchange of business information. Internet is used mostly for promotion, but there is a number of good experiences in more effective usage of its services. Analysis in B2C and B2B segment is the following:

B2C E-Commerce

There are several online outlets offering merchandise for sale on-line but they are drawn towards Serbian and people working abroad - as they are the ones to most likely have valid credit cards to support the online shopping.

Many local businesses have websites with mainly static content. There are 12.528 registered company domains. Information is not updated regularly and may be inaccurate. Websites provide information on goods and services. Usually the business is done utilizing telephone and fax, though e-mail may expedite some of the process. Some businesses have introduced online ordering, however there is no electronic payment processing (such as credits cards) available" these transactions are completed usually on C.O.D (cash on delivery) terms. We can say that online retail is not still noticeable component of overall commercial activity.

Change of the present B2C situation will occur upon the introduction of the electronic banking system and appropriate legislature on both levels (Federal and Republic).

B2B E-Commerce

Many businesses post their key information on web sites. Information is not updated regularly or is inaccurate. Web sites provide information on goods and sale services. Financial statement and other relevant information on products/services and companies cannot be found. Purchases take place primarily in person, by fax or by telephone. Some businesses may have introduced online ordering. B2B interactions remain inefficient and with little transparency.

Only few businesses have B2B transactions supported by electronic

[71] SA research, comprehending 50 companies & institutions, was made in order to get objective impression about the readiness of various. This group was made from the following types of organizations: 10 trade firms, 8 banks, 2 financial institutions, 10 big producing organizations, 6 logistic, 4 service and 10 small and medium enterprises (SMEs). A list with 51 questions about important aspects of information systems, especially interesting for introducing the e-business, was made.

systems (e.g. systems and databases), but some paper-based transactions (e.g. signature or the company seal) are usually required at some point. Electronic B2B transactions are only a small percentage of the overall B2B commerce. According to the transaction report for 2000 of web organizations dealing with electronic money, the amount of transactions in all directions was slightly less than 500.000 USS.

According to a recent poll by the Serbian Informatics Society; over 90% of companies utilize e-mail. Approximately 70% of companies have its own web site (basic content with the general company information and contact). Only 57% of companies have posted their products and services online. Only a handful of companies are posting the prices for their products and services online. These are only modest activities and we can say that electronic systems, on-line transaction security systems and formal banking establishment do not support on-line transactions, shopping and e-commerce.

Some Barriers to e-commerce in Serbia

- Lack of critical infrastructure.
- The cost of broadband access is still very high.
- Many local businesses are not utilizing their ICT to their benefit - often times they own computers, but do not have specialized software or trained staff to use them.
- While most major international vendors do have representation in Serbia, (IBM, HP, Cisco, Microsoft, Siemens) most of their offices deal with sales, and not research or production.
- Missing legal infrastructure.

Some Serbian advantages for e-commerce development

- Serbia has a high rate of highly trained IT professionals.
- Local vendors that can that produce world-class IT solutions (Comtrade, SAGA, Energodata, Institute Mihajlo Pupin). Nevertheless, these vendors are often overlooked because of lack of business organization and promotion of local IT industry.
- In January 2003, thee Ministry of Finance, alleviate customs duties on personal computers to help stimulate purchase of IT equipment by individuals and small businesses. This is crucial since the cost of hardware and software in Serbia is higher than in other countries in the region

Best-case examples in e-commerce:

- Krstarica
- YU Internet Bazar
- Hemofarm -Vrsac
- IDEA-Belgrade

e Business in financial system of Serbia
(Internet usage for online banking)

The financial sectors of Serbia and Montenegro are supposed to play the main role in providing technical technological, organization legal and economic conditions for the country to be involved into the world flows.

The Banking sector is the initial one in e-business introduction. The only important experiences in electronic fund transfer in the country are connected to JUPLAT network use for national payment operation and SWIFT for international one. In future, the Yugoslav banking system will implement the basic elements of e-banking, particularly in the field of system of payments.

The key activities in the financial system of Serbia monetary and payment systems of Serbia and Montenegro work independently in order to adjustment of the national payment system infrastructures to the European payment infrastructure and to establishment of basic conditions for financial market and banking activities to develop in the accord with the contents of contemporary e banking are

- Organizational & technological redesign of the payment system,
- Introduction of security settlement systems and
- Introduction of payment cards into retail payment systems.

The payment system redesign is being implemented in accordance with the nature of changes in the world payment systems. As they are a result of interactions between technology end economy, the Serbian payment system reform calls for changes based on two dimensions:

- The provision of conditions that enable the development of the market payment system, which is one of the essential elements of the development and working of the whole market economy.
- The conversion of the paper payment mechanism into the electronic one.

The basic element of the first dimension is an institutional change, which means that Serbia's commercial banks took over the country's payment system from the Accounting Payment Bureau (ZOP) in January 2003[72]. The basic institutional pre-condition for realization of these changes present The Payment Operations Act. This Act requires payment operation to be transferred from Social Accountancy Service (ZOP - Serbian abbreviation to be used in following text) to the banks starting from January 2003. Technical and technological bank capacities for performing these tasks is a condition for license obtaining. The banks have to be capable to use electronic payment order, to perform electronic transfer and to create central register for e-trade securities. The concrete activities, which have been carried out, include the following important elements:

- Integral Payment Operations System (ISPP - Serbian abbreviation to be used in following text) services,
- Securities e-trade,
- Bankcard industry with EuroPlanet.

This change put an end to decades of state controlled financial transactions and brought the country's payment operations up to EU standards.

During the first two months of the new payment system implementation, the most frequent problems arose from the established practice and habits which means that advices of payment are delivered to enterprises by the banks (in the former system, they were taken over by ZOP) as well as a possibility that the counters in the banks become a bottleneck (being a result of the former customers' habit to make payments between noon and 1 p.m.).

Conversion of paper payment mechanism into the electronic one - as the second dimension of the reform - is stressed in the Law on Payment System, which prescribes the new requirements. A bank must be technically and technologically equipped and its employees technically trained if it wants to get an authorization to carry out payment operations, otherwise it must do it through an authorized bank. Banks have also to use electronic payment orders and EFTs in payment operations.

[72] ZOP was a centralized clearing and settlement system of accounts of all legal entities in the country, managed from within the Yugoslav central bank. It made payments between entities as interaccount transfers, executed all tax collections and charged commission for its services. The bureau took commission for every transaction, had the right to block any transaction and could dictate how much an individual could withdraw from his bank accounts

RTGS functioning is based on abilities of banks to:

- connect through three independent lines central bank private network i.e. CBS, SWIFT, and the Internet (has not yet been in use)
- Send messages in the SWIFT or XML standards, and
- Provide safety of transactions by the SWIFT standards (for the SWIFT network) or by private and public keys (if banks use the central bank network). The central bank will certify public keys as soon as the Law on electronic signature (this Decision was made in accordance with article 39 of the Law on the payment system) has been passed.

A general examination of the Serbia's banking market shows that foreign banks are willing to introduce e-business, which makes sense taking into account their past experience in e-banking and their financial recourses. Home banks are likely to be motivated and induced by this competitive factor of the e-banking development.

Bankcard and EFT industry in Serbia is undeveloped, but its card market is growing rapidly with using local debit card YUBA Card at POS device and bank branches. The local banking market and government are aggressively pushing card products as solution to an inefficient paper check and cash salary. According to the situation in 2001 in Yugoslavia existed foreign bankcards like VISA and EUROPAY, while non-bank cards were AMERICAN EXPRESS and DINERS, still in very limited volume. 6 principals and 25 associated banks issue VISA card. It was registered 30 000 issued cards, that there were accepted on 12 000 places in the country. According to the decision of VISA International, cards issued in Yugoslavia could not have been used abroad. For EUROPAY cards 7 banks principals are registered (five more were in negotiations for principal statement), but there were no issued cards nor existing processor and reception network.

At the beginning of 1996, the initiative was given to perform unique national card project at the level of Yugoslav banks Association, called YUBACARD. It may be issued to all the citizens having bank current account, both as legal entities and entrepreneurs (Business card) and junior card to those under 16Projected functions of this card were: identification, getting the cash at ATM and counter terminals, and payment at POS terminals. The reasons for orientation towards the national card were: lower cost comparing with foreign; banks independence in policy creation, organization and working technology; domination of card transaction in the country (95% of all transactions to be made by card). Up to date banks undertook the following activities related with YUBA card project: accepted issuing program (22 banks and Postanska stedionica), agreed on internal rights and obligations, started card issuing (according to the plan till the 2003 it is expected to be issued 2.000.000 cards). Banks have also organized 5 local nets ATM/POS system (up till now each bank treated only the cards they had issued), installed 45 CDs, concluded contracts with 12.000 acquiring places on card acquiring and prepare conditions for accepting of YUBA cards on bank and post counter desk. Through Bank Association switching center is organized, but up till now only two local ATM/POS networks have been connected. It is planned to be connected all the five networks.

To overcome the problem of insufficient demand for these services, caused by a weak purchasing power, certain banks have stimulated the use of YUBA card by deferred payment (up to 90 days) and consumer credit arrangements with some card owners. At the same time, to overcome the most important comparative disadvantage of a national card - its inability to be used out of the national payment system - some efforts have been made so far for the card to get an international character through bilateral agreements with other countries (Greece).

The introduction of payment cards as an alternative to existing cheque and cash payments is important in Serbia on account on several economic interests

- Firstly, the compatibility with existing world systems has imposed the necessity of e-commerce and e-banking development, which is generally impossible without electronic payment system including development of different applications (electronic cash, electronic cheques, credit cards etc.) within components of the basic infrastructure and with electronic cards focused.
- Secondly, the national banking cannot be competitive in relation to its transactions or prices without e banking.
- Thirdly, a decrease of cash participation in money supply total is especially important as a measure against gray economy.

For further dynamic development, it will be important to make a choice between two alternatives: magnetic stripped cards and chip cards as well as national and international systems. Financial reasons could be in favor of the national card system, but the advantages of the international card usage would probably prevail.

EuroPlanet is an Electronic Banking Services Provider that will provide a comprehensive EFT network in Serbia. As joint venture Company, it is formed in December 2001. by Euronet Worldwide Arius and Komercijalna bank. EuroPlanet will be the first company to offer both Europay and Visa issuing and acquiring services in Yugoslavia, a country that previously had limited access to international card organization. Its goal is to become main switch, serving as a major provider of international card services in expanding card and EFT market. It will develop and operate the comprehensive EFT network supporting ATM, POS device, Card Issuance system and Transaction Authorization for bank and card issuers in Serbia.

Some barriers to e-banking introduction:

- Telecommunication infrastructure is underdeveloped
- The Law on digital signature (there is a draft of it) has not yet been enacted
- Some necessary changes in the Criminal Law have not been made (payment cards abuse has not been treated as a criminal act).
- Infrastructure costs are characterized by high initial costs at the beginning of the usage and they represent a serious financial burden even for the largest and most ambitious banks.
- Foreign principals impose additional increased membership fees due to higher risks.

Project in e-banking

Securities trade project is in accordance with ISSA Update of Original G 30 Recommendation and EU directives 98/26. This project is based on immobilization and dematerialization principals. According to temporary solution, valid till the inauguration of new special Federal Law on Security Market, NB of FRY (and its organic part ZOP) shall perform the following: a) the unique central register of securities emission, b) central securities deposit (depot), c) accounts evidencing deposed securities and d) accounting of securities. In the second half of November, 2001 the project is extended to trade with the "old foreign currency savings" bonds, while in the following few months it is planned to be even wider and to encompass the share trade, as well. All trade operations are electronic.

The system functions based on WEB service for the access to central register, PLATNET network and operative system Microsoft WINDOWS 2000. The register of issued bonds is executed according to the standard ISO 6166. For series A 3 ISIN number are used in accordance with their

expiry date plus some internal marks. For series B 1 ISIN number is used. CFI numbers are used for the securities classification. This is in accordance with standard ISO 10962. Usually this is six-digit mark that more closely defines each security (D for - debit, O for -bond, F for -fixed interest rate, G for-government guarantee, F for - fixed expiry date, N for-n bearer or registered owner).

Bonds are evidenced on issuer's register accounts and register account of initial owners (according to bank's receipt and verification), by ISIN identification for each owner. Through the owner's account all the changes of ownership are registered. In the same time, the owner's account reflects its current statement. The structure of owner's account is following: first 4 digits are central register marks or its article, next 3 digits are account type marks, the following 10 are owners situation account, and the last two are controlling numbers.

Best cases example-e-banking

Credit Bureau of ASB

The Credit Bureau is an emerging national institution whose task is to supply interested credit beneficiaries with some information in the form of credit reports, upon the exclusive consent of the subjects affected by the information. It has been scheduled that only banks are to be the first beneficiaries and later on a wider circle of beneficiaries (employers, insurance companies, state institutions, judicial organs). The establishment of this institution makes a constituent part of the preparations for the Basel II application and adjustment with the installment credit directives of the European Parliament and Harmonization Council. The concept of the Credit Bureau is based on West-European models, especially that one of Germany's "Shoufa", but slightly different. Such an organization should make possible a growing cooperation with other European institutions for credit insurance. The technical-technological and organizational infrastructure was outsourced by the BELIT company, while the very solutions are based on Microsoft.

The Credit Bureau is in the organizational scope of the Association of Serbian Banks (ASB) due to the fact that the Banks Association already has at its disposal the initial database, substantial technical-technological and personnel necessary conditions able to perform all these activities as well as good connections with the Central Bank and commercial banks. The installed equipment is scalable and standardized so that the database supplemented with expanded data and inquiries can be added. The existing information system operatively supports the following services: web presentations (www.finnet.co.yu), FTP service for the exchange of electronic documents, Bank Market for electronic trading, Bank Report for electronic reporting and Bank Kurs (Exchange Rate Bank) for distribution and exchange of exchange list.

The Credit Bureau deals with: gathering information on the credit-worthiness of individuals - banks' clients, keeping the uniform database on the financial reliability of the clients, analyzing the abuse made by banks' clients, taking actions to stop these abuses and providing other banks and information service users with reports on the financial reliability and solvency of the banks' clients. The whole system of the relationship between the Credit Bureau and banks works based on reciprocity.

The formation of the uniform database consists of two phases. The first phase comprises the formation of a client database containing the data that the Banks Association and the banks themselves already hold. These data include information on the individuals' abuse of their current accounts (the so called 'C list' which has been kept in the Association since 1 January 2002), the individuals' abuse of payment cards (the so called 'Stop lists' kept by the banks for foreign payment cards as well as four domestic processing centers for home cards), the credit reference of individuals, i.e. banks' credit beneficiaries and their credit reliability, practice of being in default (kept by the banks extending credits).

In the second phase, the above mentioned data should be supplemented with more detailed information provided by the Ministry of Internal Affairs (that is, police), Public Utility Service, Electric Power Industry of Serbia, telecommunication operators, municipal courts, tax authority, etc. Consequently, these institutions would be allowed to use the data provided by the Information Agency. The data are to be transmitted to the Credit Bureau only electronically with the standard cryptographic protection.

The Credit Bureau places authentication, authorization, and safety mechanisms to the banks of services of the Information Agency. It is possible to connect banks with the Credit Bureau through a computer dialogue UBS (KBDA) or Credit Bureau ABS online (via the Internet), by taking over, mail, fax or telephone. The safety of the system is supported by the system of electronic certificates on a smart card, that is on the level of the cryptographic SSL protection that enables a complete security of data transmission and it gives the authorized persons the access to the database only (two-level authorization and identification). In accordance with this mechanism, the electronic delivery in the real time is made only to the users certified by the Association.

The credit report- being a document that provides information on all (up to the moment of its handing over) credit activities of a particular physical person that submits an application for credit granting - is formed on the database on credit activities and credit indebtedness of physical persons. It contains four groups of information concerning: 1) identification, 2) credit reliability, 3) judicial, and 4) recent inquires. A credit report is forwarded at a request of the bank, upon the physical person's confirmation in writing to whom the information refer. Only one report may be forwarded based on one confirmation. Documents for data exchange between banks and the Information Service of the Credit Bureau are in the XML format, have a digital signature and cryptogram executed by electronic certificates on the smart card.

It was estimated that:

- These credit activities should start on 1 November 2003 comprising 10 members;
- The number of members will rise by ten members in average in each quarter up to 31 December 2004;
- A report on credit reliability will be requested for 50 per cent of submitted credit applications during the first two months;
- The number of requests will rise by 10 per cent quarterly (up to 90% till the end of the reviewed period);
- The number of credit applications will grow by 5% per cent quarterly compared to the average number of extended loans.

Due to the extension of the system test phase, the system has not been made operational so that it is not possible to judge its practical applicability at the moment. The system was promoted on 15 March 2004 at the Banking Fair, while the practical application of the system is to begin in the following few days.

Beokliring of Belgrade Stock Exchange

The Belgrade Stock Exchange was founded in 1884 as the first stock exchange on the Balkans. In the post-war period, it restarted its operations in 1989. Today it makes efforts to regain its fame and become a unique center of trading activities in this part of the world. In accord with the world developments of the stock exchange operations,

a special attention is being paid to the improvement of its own system, both by the development of the electronic trading and the information system itself. In an attempt to expand activities of the Exchange itself, firstly, an electronic platform for trading in "frozen" hard-currency savings bonds was installed, then it was extended to stock trading and launching of a remote trading system. Simultaneously, the Belgrade Exchange - wishing to meet a growing interest of common people in stock exchange trading- redesigned and up-to-dated its web presentation.

Initial significant trading was performed on the Belgrade Exchange in 2000 when "frozen" hard-currency-savings and shares from privatization were issued. In 2001, its activities were focused on providing conditions for electronic bond trading of hard-currency savings with an automatic coupling of orders. During 2002, this system was modified several times in order to improve its performance and adjust it to the changes in the financial market. The trading system was expanded to enable electronic trading in treasury bills of the NBS (until October 2003 when the National Bank established its own platform and took over this type of trading). The originally formed Central Register of "frozen" hard-currency savings bonds was replaced by the Beokliring System in which the different functions of the Central Register and the clearing function, as well as securities settlement were combined into one. It was formed on the basis of the existing infrastructure of NB and its own net Platnet and pursuant to international standards for electronic securities trading. The system of auction trading was adapted into a system of continuous trading in February in 2003. To make trading more efficient and closer to the world standards, an aggregate trading table was set up.

In February 2004, trading in shares from privatization was transferred to the electronic platform system (the shares were transferred out of the Temporary Register into the Central Register with which the Exchange communicated electronically). Due to the fact that the Exchange took over the database of securities ownership from their issuers for all market materials for which auctions are organized- and after the executed auctions, the broker s sales agreements in the electronic form are delivered to the Central Register- the performance of the broker-dealer companies was improved. The establishment of the electronic trading platform enabled coupling of orders according to price parity for all orders of the same price and time parity.

The transfer to the electronic trading system imposes many changes in organization of business activities, far easier accessibility of the system, a large number of transactions in trading system, making the information public etc. Along with growing consumers' requests, information function has developed. All activities were focused on a redesign and improvement of the Belgrade Exchange web presentation (www.belex.co.yu). This meant simplification of the access to the most often visited pages, provision of a user- friendly web site search and reduction of time necessary for obtaining the desired data. A complete updating of the web presentation, compiling of logical units related to stock-exchange, trading and reporting were provided. Filling forms for interactive presentation through communication with users were redesigned.

Formation of some pages (such as the trading timetable and data on auctions) is almost completely automated so that the process of data placement on the web- site is substantially shortened, and even more important, there is a minimum possibility of error occurrence. A visual presentation of the Exchange web- site is also enhanced so that all pages are uniform, bearing recognizable details relating to business operations (pictures, symbols, reports). Another crucial development is a reduction of memory space, occupied by web-presentation, by filtration of large pages (e.g. - a prospectus of a company whose shares are traded was reduced from 3 to 5 times, so that the user obtains the desired data in less than 10 seconds). Since more than 50 per cent of pages has been translated into English, not only can foreign investors get an insight into the Serbian capital market developments but the partners and collaborators of the Belgrade Exchange can much easier identify it.

The increasing number of visits to the site of the Exchange reflects the increased interest of common people in trading in shares from privatizations, "frozen" hard-currency savings bonds and rough schedule of the scheduled auctions tailored to the branch or sector to which the issuers belong.

The implementation of remote trading is the latest improvement (as of 2 March 2004). Communications devices that are being used in the remote trading test system are customized to suit safety requirements for this type of systems and so far they have successfully passed all tests. At the moment, the Exchange's devices can support 32 lines. As an increase of requests for installation of new rented lines is expected in a longer period, a complete solution of the issue of communication lines intended to the Exchange members may be found in connecting the Belgrade Exchange to an optical system.

First virtual bank: Meridian Bank

Meridian Bank is well known in Serbia as the first fully virtual bank in the country. It was founded in December 1991 as a private bank. Since the year 2000 it is connected to SWIFT system and Western Union money transfer. In that year the bank implemented debit and credit paying cards (Visa and MasterCard) as well as electronic and private banking systems. Bank is also editing debit Dina Card and using Document Management System for document archiving. It has it own net with 52 departments and with more than 5.000 POS terminals. There are more than 16.000 bank's business partners and more than 60.000 civil partners. In Meridian Bank works now 460 employees. It is cooperating with 23 correspondent banks in 12 countries in Europe and USA. Mission of the bank can be described as giving complete extent of professional banking services according to accepted global standards.

The e-banking system of the bank is based on the contemporary ICT model and it was built upon the idea of adjusting the focus of training and teaching, installation and maintenance. Main reasons for this e-banking concept are:

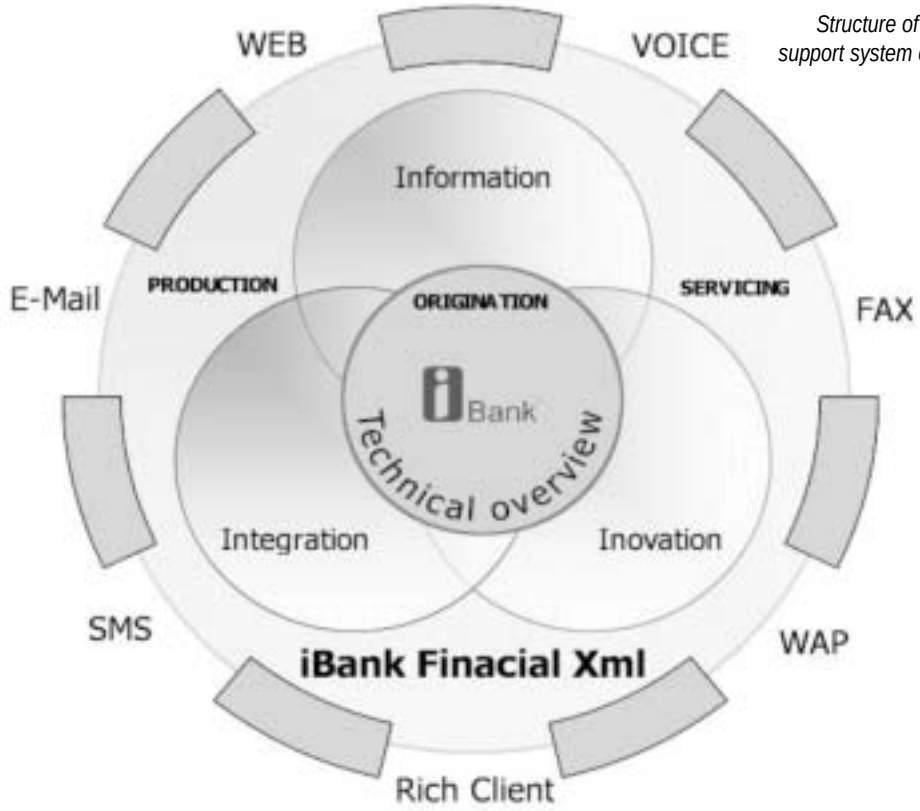
- This new communication channel is reduction of operational costs of the bank,
- Building the image of modern corporation which is capable to use prosperous IT and thus promote quality of banking services,
- Increasing interactivity with clients on 365x24 base,
- The ease of access thru e-banking system in whole country.

New values of the bank with this e-banking system are:

- Access to the information and services of the bank anytime, anywhere, on any computer system connected to the Internet,
- Increasing of the relations with bank's commitments thru the adaptation to the specific needs of deponents and the bank,
- Building of the commitment's trust in security and trustworthiness of new distribution channels,
- Reduction of costs thru these new distribution channels of e-banking services,
- Simplification of common procedures in work with bank accounts,
- Integration with the existing core-banking system of the bank.

The vision of the bank is based upon growth in all directions. It is planning to introduce (this year) new cards (American Express i Diners Club) net with 91 departments and 10.000 POS terminals in the largest

Structure of the Meridian Bank's support system can be seen on next figure:



market on net in the country, 25.000 bank's business partners and 100.000 civil partners. Special attention is focused on electronic channels for services, especially on e-bank, sms, wap, IVR and e-commerce services.

E-bank: Vojvodjanska banka

Today, measuring by the total number of transactions, VB (Vojvodjanska banka) takes the first position (out of 27 banks) by transactions carried out through the Western Union. The Bank has a very broad network consisting of 20 branch-offices and 260 outlets, 42,000 corporate clients and almost 1.5 million retail customers. As of the ownership structure, the Republic of Serbia is currently the major owner (with a 67% capital share). In August 2003 the internal organization of the Bank was adjusted to a model of contemporary European banks so that the latest business standards could be applied and market requirements met.

Last year, substantial improvements of the then existing elements of electronic operations and launching of new ones were made by this institution after particular changes in the macroeconomic environment were made. Crucial preconditions for e-banking development in Serbia, broadly speaking, were fulfilled as of 1 January 2003 when the Law on Payment Operations was adopted. Partly, this law was to replace the existing monopolistic payment system with a market payment system, and partly to create institutional conditions for e-banking development.

Pursuant to the terms imposed by the institutional changes, VB successfully organized and applied payment operations as of 1 January 2003. Thus, it started offering a higher level and quality of its services with the motto "Welcome a client" (www.voban.co.yu).

The Bank successfully took over more than 70,000 gyro accounts from NBY-ZOP and started execution of payment-operations transactions of state bonds (hard-currency savings). It got involved into the interbank settlement system (on the net and RTGS principle) and started recording the intrabank transactions in real time. Its core information system was enriched by a new range of applications to support electronic corporate and retail business operations (E-bank).

E-bank enables a user to: gain insight into the state of accounts, review the turnover, go over a statement account recording changes on the account, receive and send personal massages, pay current liabilities through payment orders carrying the current date or the forthcoming dates (through transfer orders and payment slips). The application of a digital certificate and a smart card, being a security instrument (which enables identification, identity verification, electronic signing and coding), makes sure that the transfer system assures authenticity and irrevocability of electronic messages. Payment operations services can be used through automatic telling machines, terminals, payment cards, the Bank's counter net, Call Centre and mobile telephone (SMS).

The range of E-bank offers was dramatically extended in a short period. In March 2003, the POS terminal installment in the receivers' net was certified, and until June 24, automatic tellers were installed. In the same year, the Bank gained a license to issue VISA cards so that more than 46,000 cards were issued till September, while the number of acceptance places amounted over 1,000. In the same month, the Bank Call Center and the first chip transaction in Serbia was executed on a terminal of VB within the chip-technology promotion (on the basis of the sponsorship contract with VISA International). In November, all branch offices of the Bank went online, while in December the first "Drive in" counter in Serbia and Montenegro was implemented. At the beginning of 2004, the replacement of cheque cards with Visa Electron cards started. A Visa Electron can be used at the request of its user either as exclusively identification one (in addition to cheques) or as a

payment card (for purchasing at all merchants with a recognizable Visa label or withdraw cash at the Bank's counters or automatic tellers).

The business e-performance of the Bank can be measured by an increase of a number of users of these services. In the corporate sector, the increase is measured by the number of accounts accomplished electronically and orders issued based on these accounts. Figures show that the number of these accounts, at the level of the Bank, increased more than ten times in 2003 (from 232 in January to 2,668 in December).

The Kragujevac branch can be an example of some interesting indicators, as this Branch executes the highest percentage of e-orders within the whole Bank. In January 2003, when the number of accounts executed (from which payments are executed) electronically, made up 0% of the whole payment operations, in December it made up to 15%, while the volume of payment operations through these accounts made up to 36% of the whole payment operations. It can be concluded from these indicators that e-orders are primarily accepted for a large payments execution.

The turnover analysis on the VISA POS terminal of the Kragujevac Branch shows that since May 2003 - in the following 5-month-period - the number of active terminals increased much faster than the turnover on them since when there was a marked turnover increase so that in January 2004 both indicators were equalized. These trends prove that the potential development of the Serbian market in this area is very promising.

Questionnaire research results from Business Sector (sample- 73 private and public firms from various sectors and various by their size)

Private Sector

Interviewed private companies belong to various business activities and they range in size from very small from 1 employee to big private firms with over 7000 employees. The most of them have low percentage of exported goods /services. Majority interviewed private firms (65,8%) consider to have the same conditions as the firms from public sector when applying to government tenders and announcements, while 34,2% consider that they are not equally treated as public firms. Most common problems connected to government tenders are: corruption, lack of transparency and right information. Present are also the problems in legal procedures and ambiguity of tender laws.

In private firms, IT sector is usually not big. Up to 60% of interviewed private firms have only 5 employees in IT sector, 80% firms have 10 IT employees.IT employees are mainly administrators. In 20,7% of interviewed private firms there very no IT developers in IT sector and in 26,9% no IT designers. Quality testing (involving alpha and beta models) is preformed in only 27,7% private firms.

Computers are most often used for administrative procedures in 100% of received valid answers, than in finances 98% answers, but in the production process in 62% of all positive answers.

The majority of interviewed private firms are familiar with the concept of Republican Agency for Information Society, but are very badly informed about any results of IT regional activities such as the eSEE Initiative. 75.5% of firms do not know about eSEE Agenda, and even 87% have not heard about Regional Guidelines for National Information Society Policy.

Private firms in 82% cases are not satisfied with existing ICT policy and strategy and consider that they do not enable maintenance of competitiveness of domestic IT products. Also, between 87 and 97 % of firms consider that ICT policy and strategy do not improve neither Greenfield nor Brownfield investment in ICT sector. Through the laws and regulations in ICT sector and development of Information Society, Government has little influence in private business sector. Legal infrastructure is missing (digital signature law, cyber crime law, and law on intellectual property right), easy approach to Internet and providers competition is missing, as well as there is a slaw upsurge in ICT in industry. Having all this in mind 76.6% of interviewed private firms consider that existing ICT strategy is very little suitable and adequate for development of private business sector. In half cases, (55.6%) firms from private business sector think that they can have little influence on the development of the strategy for the development of Information Society.

State owned companies (public sector)

In many aspects, considerations of state owned companies are similar to those of private companies. Also, the majority interviewed public firms (53,8%) consider to have the same conditions as the firms from private sector when applying to government tenders and announcements, but 46,2% consider that private firms have better conditions.

In state owned firms IT sector is bigger than in private firms. Up to 55,6% of interviewed public firms have 13 employees in IT sector, and 77,8% firms have 30 IT employees. 87.5% of interviewed public firms have up to 11 IT administrators and 4 IT supervisors. It is interested that 50% of interviewed public firms have no IT designers and other 50% have only 2 designers. Quality testing alpha and beta are preformed in 91.7% public firms, which is much more than in private sector.

In public sector computers are also most often used for administrative procedures in 92,9% of received answers, less in finances 86,7%, but in the production process in 42,9% of all positive answers what is worse situation than in interviewed private firms.

The 53,3% of interviewed public firms are familiar with the concept of Republican Agency for Information Society but are also very badly informed about any results of IT regional activities as is eSEE Initiative. About eSEE Agenda do not know 73,3% of firms, and 80% have not heard about regional Guidelines for National Information Society Policy.

In the same way as private firms, state owned firms are not satisfied with existing ICT policy and strategy and consider that they do not enable maintenance of competitiveness of domestic IT products, 91,7% of received answers. Also 77,8% of state owned firms share the private firma opinion that ICT policy and strategy do not improve neither Greenfield nor Brownfield investment in ICT sector. 71,4% of interviewed public firms consider that existing ICT strategy is very little suitable and adequate for development of public business sector and 75,0% firms from public business sector think that they can have little influence on the development of the strategy for the development of Information Society.

Considering the availability of computers, Internet connections and WEB sites in private and public sector firms the situation is the following:

- In 42,9% of reported 63 cases have 10 or fewer computers but 10 or less computers are connected to Internet in 71% out of 63 cases. Fifty or less computers have 77,8% companies and over 95% of companies have 200 or less computers. In 88,7% of reported 63 cases 50 or less computers are connected to Internet and 96,8% of interviewed firms have 200 or less computers connected to Internet.
- In 48,3% of reported 60 cases, 18 or less employees use computers and 6 or less employees use e-mail/Internet. In 90% of reported 60 cases, 200 or less employees use computers and 120 or less employees use e-mail/Internet.

Firms listed very similar barriers when explaining the problems in using computers for all employees and in using e-mail or Internet. Most often mentioned barriers are the following for all three cases: insufficiency of PC, education and inexperience, inadequate skills. Courses and self-education are two the most often ways that employees are trained for computer use, use of e-mail, or Internet.

Organizations mainly use e-mail for business contacts and communications. Internet is mainly use for business purpose in 15,1% of total 73 cases for information and explorer in 2,7% cases and for marketing in 2,7% cases.

Of the total 73 interviewed firms 46,6% have its own WEB site and 34,2% do not have it. Main reasons for having WEB is marketing and product and company promotion. In less than 2% of 73 cases, the reason was e-business or commercial sales and support. Those firms that do not have WEB sites as reason for it quote lack of money or the answer was that website is under construction. There were also firms with the opinion that WEB site is not necessary for their business.

Concerning research results form business sector state is not active in undertaking activities to bridge existed digital divide.

In 68,9% of valid answers firms do not know about initiatives of state to bring connectivity to rural areas, or to ensure support for ICT use in low-income communities (79,3%). The majority (over 80%) also considers such activities as expensive either for state or for end-users.

Business sector is not aware of the opportunities that ICT has to offer and is not familiar that state undertakes programs to increase that awareness (77, 4%).

E-government is at a very early stage of development from BS point of view:

- There is not sustainable e-government system to service the need of poor and enable their participation in this system (73,3%);
- Nearly 90% of respondents consider that state is not implementing effective system of decentralized decision making that will engage participation of low income and traditionally disenfranchised groups, nor ICT is used to give this groups an effective voice;
- In addition, according to 87,7% respondents there is not high level of understanding of the role that the State needs to play in order for ICT to help combat poverty.

Government little support small firms and micro entrepreneurs in the use of ICT consider 62,5% of respondents. Training programs for work force to become computer and Internet literate are missing existing programs can little upgrade work-force skills according to 71,9% respondents form business sector.

3.8. E-EDUCATION

3.8.1. ALBANIA

Education and research sectors in Albania were developed mainly during 1950-1990.This development was conditioned by political, ideological and economical situation of the country, in particular by total application of a self-reliance principle and isolated considerably from outside development.

Development of education and research in nineties and after was conditioned by deep political, social and economic changes that seriously impacted academic sectors. Decentralization, liberalization, opening with abroad and increasing of international collaboration, financial problems, and brain drainage, decreased collaboration with public sectors characterize this period. Based on statistics of Ministry of Education and Science, in the period 1991-2004, number of institutions in public education is decreased about 30%. Except the Academy of Sciences, majority of R&D institutes depending on other ministries disappeared or shrank considerably.

Actually, it seems that the budget, especially for education, is gradually increased in years but when compared with DGP it is low [WWW.MASH.GOV.AL]:

The budget for education is approximate 10% of state budget

Year	Budget in MLeks	Budget in % of GDP	Budget in M.USD
2003	21,536	2.9%	196
2000	16,421	3.1%	126
1995	8,461	3.7%	56

Schools statistics for the year 2001-2002 include:

Category	Schools	Students	Teachers
Basic education	1,798	523,253	27,672
Secondary education	372	118,577	5,720
University (faculties)	11 (39)	42,160	3,285

Number of students in natural sciences, mathematics and informatics for the same period was 1,680.

Computers were introduced in 1971 with creation of the first Center of Calculus, in that time as a department of University of Tirana. During the seventies, four other specialized computer centers were created and in the eighties, a metropolitan network was built in Tirana funded by UNDP. This entire infrastructure was used intensively for research and engineering design, and abandoned in early nineties as result of economic difficulties and reduction of R&D work. New ICT development in nineties was oriented towards creation of PC labs and local networks.

ICT education started in seventies with few university courses dedicated in programming. In the eighties, the Chair of Informatics was created and full university curricula started at University of Tirana. Short and mid-term courses were developed as well. The main objective in eighties was creation of a great number of different specialists with knowledge on computer programming and mathematical methods, able to solve problems of a centralized economy.

In nineties, together with liberalization, personal computers "invaded" the country and the necessity for fast widespread of knowledge on ICT was obvious. Many organizations started organizing short-term courses on basic computer skills. Classes in computer-skills have become a popular part of the Ministry of Labor's re-training program for the unemployed. A joint action was organized by Ministry of Education together with NGOs as Soros Foundation to introduce IC in high school, and today a full four-year curriculum is developed for this purpose.

This curriculum is applied in all high schools, with big difficulties due to lack of trained teachers and of PC labs. The curriculum includes general knowledge on computers, elements of programming, standard general-purpose software packages, and Internet knowledge. The curriculum includes theory and practice, the latter as exercises and labs. Experimental textbooks are available, taking into account the specialization of classes. Only 20% of teachers of technology and informatics are trained for the new curriculum. Considering the status of ICT in Albanian schools, the situation is improved during last years, but still it is inadequate. In June 2002, about 500 PCs are available in 400 high schools, and only 25 high schools have a computer laboratory with 10 computers each. Most PCs are older generation models, and networking does hardly exist. At the time of writing this report, all high schools in Tirana are equipped with a computer laboratory with 15 computers each and 24-hour Internet access, and one computer is also provided to the secretariat of the school. There are projects to equip all secondary schools with computer labs and Internet connectivity, and actually 30 schools are targeted.

In universities ICT training is introduced in almost all branches, ICT sectors and PC labs were already created in many faculties. Together with the department of informatics at the Faculty of Natural Sciences, the Faculty of Electrical Engineering developed specialized classes in computer science and telecommunications that produce graduates in computer sciences. Faculty of Economy started in 2003 a full university curriculum for ICT in business.

Departments of ICT are created in some of universities in other cities, but their situation remains doubtful due to lack of resources. Teaching of ICT in some universities curricula is yet out-dated and do not reflect properly the progress on ICT. As result of brain drainage, there are shortages of qualified staff for a good teaching. A complex of administrative and financial problems amplified by political oscillations have their negative impact as well. Ministry of Education and Science is working for qualification of staff from universities of Shkodra, Elbasani, Korca and Vlora.

Despite problems and difficulties, university enrollment doubled in nineties. From two universities with some branches in other main cities in early nineties, today there are 10 universities (39 faculties) mostly created through splitting from old universities, and with problematic teaching and R&D quality when compared with universities of Tirana.

Campus of University of Agriculture situated outside Tirana was destroyed in 1997 and a considerable quantity of research and education materials was lost - everything had to be recreated from the scratch. Today, this university campus has a partial local network extended in few buildings only, and was built with funds from the National Program for Research and Development.

Funding sources remain the principal obstacle for universities to be equipped with ICT infrastructure and Internet connectivity. Universities got a large number of computers from different donors and grants. Different faculties have local networks connecting a part of PCs in use. Number of PCs for some universities is estimated as:

University	Students (2001-02)	Teachers (2003-04) Full + Part Time	PCs	Networking	Internet
Tirana	15,800	651 + 603	~ 300	yes	partial
Polytechnic	3,200	259 + 249	~ 150	yes	partial
Agriculture	2,700	177 + 59	~ 120	partial	partial
Shkodra	6,952	134 + 99	47	partial	problematic
Elbasani	5,094	123 + 161	130	partial	yes
Vlora	1,596	76 + 287	130	full	full
Korca	1,833	77 + 84			
Gjirokastra	3,743	97 + 96			
other	1,242	156 + 294			
Total	42,160	1,750 + 1,932			

(~) - *approximate data.*

During the nineties, the faculty of Natural Sciences used a couple of old VAX minicomputers. Today this faculty, together with the Faculty of Electrical Engineering has few workstations. In general technical faculties are better equipped with PCs and have better networking. But old equipment is not replaced regularly, despite the fact that law recognizes a depreciation rate of 25% per year, and this creates grave problems for normal teaching and maintenance.

Considering Internet connectivity, majority of faculties is connected with different ISPs, but normally they do not implement in-house Internet services while using those offered by ISPs. In other cities only two universities have Internet connection - in Elbasani and Vlora. DNS records from EDU.AL include 24 names, but only 9 institutions have web sites.

An important aspect of education is "distance learning". Two main universities of Tirana have specialized departments for this purpose. Department of distance learning at Polytechnic University is more active and has a dynamic web site (www.desalb.edu.al). Nevertheless, distance learning has many problems and it requires a radical reform to be transformed in a real and effective "distance learning" system. Considering backwardness of national ICT infrastructure especially in remote areas and reduced capacities of universities that are not able to accept all requests, proposals are done to use TV broadcasts for teaching purposes as the only real way to distribute "distance learning" in the whole country, but there are no concrete steps in this direction. There is also a segment of "part-time" students (they follow only a small part of lectures and give examinations) that need distance-learning facilities.

R&D system in Albania suffers from similar problems as education. R&D activity is very limited, mainly due to the lack of adequate research infrastructures and insufficient financial resources. A considerable number of highly qualified specialists have left R&D institutions; a majority of them has even emigrated abroad. In particular, specialized ICT departments have suffered considerably from "brain drain". Because of the same reason, all public institutions have great difficulties to hire computer and network specialists for the daily maintenance of their ICT systems and infrastructures. The academic community is not considered for and is not involved in many important ICT projects, which penalize ICT projects by not involving qualified independent experts from the academic community, it penalizes also these specialists and would eventually encourage them to emigrate. It has severe although hidden consequences for both research and education systems, with negative long-term effects.

Important institution dedicated on research is Academy of Sciences, created in 1973 and funded from state budget. It has 14 research institutes and centers, which are administratively autonomous entities. One is specialized in computer science - Institute of Informatics and Applied Mathematics (INIMA). Institutes are grouped in two Sections, the Natural and Technical Section and the Section of Albanology. Besides the institutes, the Academy has two big libraries with a considerable number of books and journals, which are the Library of Academy of Sciences and the Library of History and Linguistics. Almost all institutes have important research archives with data collected for many years. A great part of researchers works part time teaching in different faculties. Some institutes organize small practical and/or specialty training courses. INIMA organizes regular training courses on basic computer usage and Internet.

Institutes of Academy have partially developed local networks. Majority of them use limited Internet access to private ISPs. INIMA is fully equipped with networked PCs (40 personal PCs for the whole staff and training, and backbone servers and routers). INIMA serves as Internet provider, including services of email and web hosting, for the Academy itself and few small research entities that share the same building. Connection with INIMA is wireless. Center of Geographical Studies and Institute of Seismology use dedicated links as well; the former is connected with the backbone of Academy with a private line. Except INIMA other institutes have shortages of ICT staff for maintenance. In total, for 233 researchers there are about 168 PCs. Some work for digitalization of scientific data is already done, but not in systematic way suitable for use in networks.

Other institutes, formerly depending from different ministries (actually many of them are affiliated with Ministry of Education and Science), have staff that varies from 10 to 40 researchers. They are partially equipped with computers, networks and Internet access (mainly dial-up). There are also e libraries that have built web sites, that is 4% of all libraries countrywide. Only National Library had registered a domain name, but actually inactive.

Considering the national research & education network (NREN), Albania does not have any NREN backbone. During the Soros Foundation Internet project, a small backbone was built using wireless technology. Because of low synergy between potential stakeholders, only in mid 2002 the first organizational structure for the Albanian Academic Network was created, with a joint decision by the Ministry of Education and Science and the Academy of Sciences, unfortunately these structures have no significant impact and more than one year without functioning.

Actually, INIMA participates in the EC FP5 project SEEREN, which aims to extend GEANT connectivity to Balkan Area, and in this framework a link of 2 Mbps is operative during 2004, connecting INIMA backbone with GRNET and GEANT. Academy of Sciences, Library of Academy, Center of Geographical Studies and some other small organizations use this capacity also. Private lines (wireless and cable) are used for these links. Attempts are in process to extend the connectivity towards other academic institutions as well.

Specialized training and/or certification on ICT are in its first steps. There is an NGO that offers Microsoft certification. Creation of Cisco Academies has lagged behind due to lack of synergy between potential stakeholders and lack of financial means. In this context, the aid from international organizations would help to overcome obstacles. Another example of certified and EU-accepted computer credentials is the Expert Certification that had been introduced in Albania with assistance of PARSH/GTZ project. Details can be found at www.xpert-online.de

3.8.2. BOSNIA AND HERZEGOVINA

3.8.2.1. EDUCATION SYSTEM IN BOSNIA AND HERZEGOVINA - A SHORT OVERVIEW

Basic and high school education has many characteristics typical for socialist system of former Yugoslavia - collectivistic approach, goals equal to all, same curricula for all, one schoolbook for one subject, too many lecturing with no practical experience, blackboard and chalk as basic "equipment", and emphasis on reproductive knowledge. Curricula have not changed significantly - recent changes are more formal then essential.

Permanent education of teachers does not correspond to current needs of modern school.

Basic data for 2003/04 school year are as follows.

	Total BiH		Federation BiH		Republika Srpska	
	Basic schools	High schools	Basic schools	High schools	Basic schools	High schools
Schools	1,804	291	1,052	208	752	83
Pupils	361,688	166,721	247,590	114,428	114,098	52,293
Teachers	20,621	10,595	13,735	7,703	6,886	2,892

Permanent education of teachers does not correspond to current needs of modern school.

In 2000/01, about 97% of children were attending basic school, but only 56% is attending high schools. The World Bank estimates that BiH is spending about 2,7% of GDP on basic education, and 1,4% on secondary education. Almost 90% of budget for education is spent on salaries for teachers. It means that very small portion of budget is available for development.

In federation BiH, education is financed on cantonal level. It is rather problematic since many cantons are too small to provide sufficient financing. BiH education system is very expensive having expenditures calculated per GDP per capita, although the absolute amount of the budget is relatively low. Insufficient financing that lasted for years produced substantial infrastructure problems, but also general decrease of motivation of teachers.

In such situation, usage of ICT in teaching process is more exception based on personal initiatives of some teachers, then the result of systemic behavior.

Currently, BiH education system is going through radical reform on all levels. The reform is experiencing many problems. Even though bad economic situation of the society as a whole and non-sufficient financing are negative factors, this is not the major obstacle. One of the aims of the reform is to make education less dependent on daily politics. It seems that this goal is not achieved at expected level, and it continually slows down the reform processes. Even politically very neutral questions, such as introducing the ICT in teaching process, become unnecessarily complicated and "hostages" of political goals. In addition to that, the fact that BiH has no ministry of education on state level is not makes things even worse.

3.8.2.2. LEGISLATION, REGULATORY AND POLITICAL ENVIRNOMENT

The legislation regulatory and political environment is very hostile regarding the development of information society and knowledge based economy. Even though economic situation is very often "blamed" for slow progress, it seems that political environment is the major obstacle.

For example, Bosnia and Herzegovina has accepted and started implementing the educational reform strategy. That process is coordinated by OSCE mission in BiH. It is quite indicative that this strategy does not include almost anything related to development of education system that should be good service for modern information society. In addition, introducing the ICT in education process is also not explicitly treated at all. Naturally, even if the strategy is implemented very successfully, it will not significantly change the ICT related issues.

Bosnia and Herzegovina still does not have the basic set of lows related to educations, and those that are already accepted do not include almost anything related to ICT.

The other example of unclear regulation is strange status of BiH academic network. The BIHARNET formally exists, but there is no real support from governments. In addition to that, Government of RS formally established the academic network of one entity (SARNET), which is not in accordance to principle that one country can have only one NREN. There are even ideas to establish cantonal academic networks. If that happens, the future of BiH NREN is not really bright.

There are several obstacles for better ICT capacities development in BiH education institutions:

- Universities that started using the treasury financing system are having a lot of practical problems - the system is not functioning well and sometimes the work of an institutions is totally blocked;
- New regulations of public procurement are emphasizing too much the price criterion - actually, low-quality criterion is emphasized:
- High customs and taxes for computer equipment do not allow the most of student population to get the computer home;
- There is no low on electronic school- books.
- The low on copyrights and similar rights is not enforced. It discourages content and software development, but encourages software piracy.

3.8.2.3. EDUCATION FOR INFORMATION SOCIETY

Digital Literacy

Education system in BiH is not good service for information society.

Basic service that education system should offer to a modern information society is digital literacy. BiH education system, in its present status, does not provide basic digital literacy for population. Curricula in basic and secondary schools are not appropriate for that purpose (some curricula do not involve any ICT related issues; some do, but are not appropriate).

Since not all pupils have the same access to such knowledge, it also results in increased digital divide.

Specialist Education for ICT

This kind of education is mainly provided by faculties of electrical engineering, but also on business schools, science faculties, and some other schools. In addition, more and more public and private education centers are offering specialist education for ICT. Many of those centers are actually offering the standardized courses of major ICT vendors (IBM, HP, Cisco, Microsoft, Sun, etc.).

Since the universities are not flexible enough in terms of curricula change, non-academic education is becoming increasingly popular. Young people are more interested in obtaining certificates that are related to more flexible and faster education (not necessarily easier). These courses are mostly those that are "trendy", and that leads us to

the question of quality. The quality of non-academic training varies a lot. There are some good courses on the market, but there are also many that do not correspond to even basic quality criteria. Since BiH does not have any functional system of certification or quality control in that area, it is quite hard to evaluate the value of certificates.

Recently done field research[73] shows that BiH business does not believe that basic and secondary education provides sufficient basis for ICT development:

Question: To what degree do primary and secondary education deliver strong literacy skills that will serve as bases for development of ICT?

Only 23,3% companies that were included in research believe that primary and secondary education deliver fail amount of literacy skills. It is quite indicative.

	Frequency	Percent
Fair amount	16	23,2
Little	35	50,7
Not at all	3	4,3
Do not know/no answer	14	20,3
Non valid	1	1,4
Total	69	100,0

Post-Education and Life-Long Learning

ICTs are changing fast. A lot of knowledge that is relevant today will not be in near future. Regardless of the level of education, life-long learning is the inevitable future for all of us.

Bosnia and Herzegovina needs to adopt life-learning concept for some other reasons too: Because of the war, and pre- and post-war problems, dozens of generations are digitally illiterate. Many such persons are unemployed.

On the other hand, there are more and more workplaces that are available but require the ability of ICT usage.

Unfortunately, there are not post-education programs organized and/or financed by the state that are aimed to change such situation. There is no low on changing the qualification. Current legislation is very non-flexible regarding the change of qualifications.

On the other hand, it seems that there is potential that can be used for systematic change of qualification of certain groups of workers (university education centers, independent or private centers, companies that are interested in new qualifications, teachers, etc.).

Research and Development

There is no organized R&D scientific work in Bosnia and Herzegovina in general, so it means that ICT related R&D activities are very rare and mostly exceptional achievement of individual researchers.

The capacities for R&D are very limited. Many researchers have left the country looking for better conditions for their work. Unfortunately, that trend still exists. The contribution for R&D is between 0% and 0,1% of GDP. Well- developed countries in Western Europe usually contribute 1,5%, while former Yugoslavia (which means BiH also) contributed even 1,7% to R&D. It is then obvious why many of those who graduate, even at M.S. and Ph.D. levels, leave the country. It is a great damage for the country. It is quite expensive to produce an engineer or physician - and then to loose him/her almost immediately.

International aspect of R&D is also not well developed. The BiH education institutions are not well connected to international institutions and international R&D projects are more exceptions then the result of systematic work. It negatively influences important processes such as transfer of knowledge, improvement of quality standards in both R&D and education, etc. In addition, one of the consequences is that BiH R&D institutions (both academic and from business) are not using internationally available R&D funds.

[73] Field Research by UNDP and UNV, 2004.

3.8.2.4. ICT FOR EDUCATION

Internet Access and Research/Education Networks

The overall trend of usage of ICT in education is positive, but so slow that the final result is increasing the gap between BiH and developed countries of EU. For example, because of the war, BiH made the connection to Internet relatively late (in 1996). However, that fact is not so bad by itself - many education institutions in developed countries also did not use Internet so seriously in early 90's. But, what is very bad is the fact that first education institutions that got the connection in 1996/7 had connection of 64k or 128k and did not change that significantly even 8 years later (64k-256k, with some rare exception of 512k)!

Presently, Bosnia and Herzegovina is probably the only country in Europe that dos not have functional academic network. Formally, BIHARNET (BiH Academic and Research NETwork) exists, but is not functional - ownership is not clear, there is no consensus between state structures about financing the BIHARNET etc. Simply, the state is not supporting its academic and research network.

During the short period when BIHARNET was functional, its segment that was supporting Banjaluka University was developed by Computer Center of Banjaluka University. At the beginning of 2000, BIHARNET was not able to provide services anymore. By Decision of Government of RS (June 13, 2000), Computer Center of Banjaluka University is been transformed into Academic and Research Network of Republika Srpska (SARNET). Major problems with this structure are: (a) it is related to part of the state, so it cannot be connected to European academic networks, and (b) even though it was established 4 years ago, SARNET is still providing services to Banjaluka University only. It means that SARNET is only formally academic network, but actually, it is Banjaluka University network.

Similar to that, some institutions have found its own solutions, but some do not have any network at all. Many faculties and other institutions are connected to commercial providers, which is not adequate (it is only the Internet access, there are no academic network services). These are all different solutions, and certainly not the academic network.

It is obvious that the key problem is the lack of finance funds for research and development at all governmental levels (cantons, entities, state).

In short, status of academic/research/education networks in BiH is extremely bad. It is serious obstacle to education and research development in BiH. It seems that governments still are not willing to change that.

ICT Capacities

ICT are not significantly included in BiH education system both as the subject of research and as a teaching tool. About 45% of teachers can use computers, but very few of them use computers for teaching. There is neither any form of obligatory ICT training for teachers nor any kind of certification.

Almost none of the education institutions have established mechanism for continuous investment in ICT capacities development.

Institutions still use mostly non-licensed software, and very few of them use some open-source based solutions.

Electronically enhanced learning and distance learning are making their first steps and very few of teachers use their potentials. Internet is rarely used as a communication tool, and only few of faculties and schools have their own web portals and web-based platforms for content management and learning process management.

Hardware

The procurement of hardware is individual by institution. It resulted in non-optimized procurement and many different standards and solutions.

Only 60% of computers in all education institutions are networked. Basic and high schools have the worst situation. It is estimated that only 10% of computers in basic schools are connected to some king of network.

The "eReadiness Assessment Report", 2003, presents the following situation:

	No of schools	No of computers	Average
Total	269	4795	17,83
Basic Sshools	133	1289	9,69
High Schools	77	1258	16,34
Faculties	59	2248	38,10

One other research[74] included 205 high schools and 384 basic schools in FBiH.

For basic schools, it showed that:

- 27% of schools has only one or no computers;
- 57% schools have less then 5 computers;
- 18% has more then 9 computers
- 4% has more then 15 computers
- 43% schools has access to Internet
- 40% schools have e-mail address
- 8% schools have web page.

For high schools, it showed that:

- 37% of schools has only one or no computers;
- 24% schools have less then 5 computers;
- 29% has more then 9 computers
- 10% has more then 15 computers
- 70% schools has access to Internet
- 40% schools have e-mail address
- 19% schools have web page.

According to this research, Federal ministry for science and

[74] "Internet in basic and high schools in FBiH", BiH Telecom, 2002

education has prepared a set of measures for connecting schools in FBiH to the Internet. For equipping 389 basic schools and 205 high schools, the Ministry has planned to spend 16,462,000 KM (1 EUR = 1.9556 KM). However, this plans has not been implemented so far.

Government of FBiH has accepted the information on Project for introducing the information technologies in schools in FBiH (March 22, 2004) and delegated the implementation of the project to Federal ministry of traffic and communication and Federal ministry for science and education. In addition, government has decided to involve BiH Telecom and HT Mostar into project implementation. By 2005, all pupils and teachers shall be trained to use ICT in education process. It is anticipated that all schools will be equipped computers in next few years. However, it is not clear what and how many computers, and the timeframe is also not clear.

Software

There is no clear strategy for software purchase in BiH education institutions. The most common "solution" of individual institutions is non-licensed software. MS Windows operating system is dominant and it is used in almost 100% of institutions. MS Office is the most commonly used application software. There are more or less successful attempts for application software development. There is almost no coordination so very often the same software is developed in several institutions.

Open source solutions are not implemented almost anywhere. Some technical faculties are using open-source in education process, but mostly as the subject of research. In 2004, the BiH Association of Linux Users has promoted the first BiH Linux distribution. It is an important development, which shows that open source is one of the options that shall be taken seriously.

Communications

There are several ways of connecting the institutions. Telecom operators can provide WAN and MAN connectivity and institution can choose between several options:

- Leased line (optical or copper)
- Dial-up (analog or ISDN)
- xDSL
- Wireless connection.

It is also possible to use VPN service.

The "eReadiness Assessment Report", 2003, shows the following:

- Only 4% of institutions use leased line;
- About 160 schools use 15 different ISPs;
- Two ISPs owned by monopolistic telecom operators (BiHNET and HPT) connect 66.40% of schools;

This situation is obviously the result of lack of systematic development of BiH research and education network.

Distance Learning

The following initiatives show the best potential:

- Faculty of Economics at the Sarajevo University had pioneering projects in distance learning development and usage (Interactive Distance Learning project supported by Soros foundation in 1988/99, and distance program in cooperation with Loyola University from Chicago, USA).
- The ODL (Open Distance Learning) Center, at the University of Banjaluka, is operational since 1999. In 2004, ODL has adopted VC technology.
- Since 2001, the Mostar University is offering the first distance learning study in BiH (information systems).
- During 2002 and 2003, WUS (World University Service) Austria has supported e-Learning development on BiH universities (Tuzla, Banjaluka, Sarajevo, Bihac, and Mostar). It had the most positive impact on Universities of Tuzla, Banjaluka and Mostar.
- At the beginning of 2003, the UCDED (University Center for Distance Education Development) has become operational. The center has video-conferencing (VC) capabilities.
- The E-Net Center (Distance Learning Center affiliated to The World Bank GDLN) has become operational in 2003, offering the state of the art global VC and other distance learning capabilities.

In terms of electronically enhanced learning, it is interesting to see the perception of various groups regarding the question of effort being made for equipping the schools and faculties that was provided by recent field research[75]:

	No of schools	No of computers	Average
Total	269	4795	17,83
Basic Sshools	133	1289	9,69
High Schools	77	1258	16,34
Faculties	59	2248	38,10

Question: Are efforts being made to ensure that the formal school system, teachers in particular, are fully equipped to help students benefit from computerized and networking learning?

It is interesting to see that only business and international organizations are convinced that teachers are not well equipped. However, less then 30% of respondents believe that there are no efforts for schools system to be better equipped. It means that obviously there are efforts that are visible, but it seems that results are not so visible.

Education Management Information Systems (EMIS)

It is clear that no education institution in BiH has implemented management information system (MIS). Actually, most of the institutions do not have even basic preconditions for that (computer network and equipment).

Universities and faculties have developed several more or less successful solutions (for example, software at the Faculty of Mechanical Engineering in Sarajevo, software at the University of Tuzla), but none of them can be qualified as adequate and integral solution for other

[75] Field Research by UNDP and UNV, 2004.

institutions. It is important to mention the on-going implementation of the EMIS for basic and high schools. That project is supported by The World Bank. The idea is to put the parts of information system into schools and ministries, which will operate on database on pupils, teachers and schools, so the parts are simple and easy to maintain, but the system as a whole can be complex and useful. The system is aimed to provide information for resource management optimization. Some pilot schools in RS, Middle Bosnia Canton and Tuzla have started to use the software, but the real impact of the project is still not easy to estimate.

3.8.2.5. LIBRARIES

BiH has 75 public libraries in FBiH, 30 public libraries in RS, and 55 academic libraries at 7 universities:

· University in Sarajevo	30
· University in Bihac	2
· University "D emal Bijedic" in Mostar	1
· University in Mostar	4
· University in Tuzla	4
· University in Srpsko Sarajevo	3
· University in Banja Luka	11

Federation BiH has about 350 school libraries, while there are no clear data for RS. BiH has 57 special libraries (40 in FBiH, and 17 in RS).

The COBISS initiative[76] is the only attempt to provide BiH librarians the functional shared cataloguing system. It is a regional initiative and it includes Slovenia, BiH, Macedonia, Serbia and Montenegro so far. During the period from 1998 to 2003, 13 BiH libraries were included in COBISS system. About 250 librarians attended the appropriate training.75 librarians have the license for shared cataloguing. About 200,000 cataloguing unites have been created in COBISS/OPAC database. In first three months of 2003, total number of system users was about 16,500. However, this cannot be perceived as a success. On the contrary, it is quite disappointing progress. Since COBISS does not have major technical problems, it may sound quite strange that not all libraries accepted it. There are several problems related to that:

- The state does not provide systematic support to shared cataloguing system development;
- Some parameters of COBISS structure are still not clear - COBISS Center that should provide technical support is BiH legal entity, but its relationship with Slovenian partner that provides the software solution is not clear; some issues regarding the ownership and access to entered data are still not clear, etc.
- Technical platform of COBISS is outdated, and it is not clear what would be the future development; and
- Additional complication are unclear questions regarding the ownership on software that was developed by Institute for information sciences in Maribor, Slovenia, but in time when Slovenia was the part of former Yugoslavia, and software development was financed by all republics of former Yugoslavia.

3.8.3. CROATIA

3.8.3.1. PRE-SCHOOL, BASIC, SECONDARY AND VOCATIONAL EDUCATION

Basic facts

Pre-school

1,067 kindergartens, of which 920 were public, 93 were private and 54 founded by certain religious congregation. There were 6783 Pre-school teachers and 89,107 attendants at pre-school institutions by the end of 2003.

Basic Compulsory

In the school year 2001/2002, there were 828 elementary schools (central schools) and 1,260 branch schools. There were 395,709 elementary school pupils.

Each elementary school is connected to Internet. 224 PC networked classrooms installed. There were 11.500 PCs installed, and there were 34,5 students/PC.

Secondary and Vocational Education

In the scholastic year 2003, there were 650 secondary schools and 49 students' dormitories. There were 19.733 Secondary-school teachers by the end of 2003. Around 96% of students enter secondary education upon completing compulsory education.

There were 196,147 secondary school students. Each secondary school is connected to Internet. 89 PC networked classroom installations. 9.500 PCs were installed, and there were 20 students per PC.

Orientation of training towards the information society

The main strategic goals of the integration of information and communication technologies (ICT) in the education system have been laid down in the Government Document Croatia in the 21st century - Information and Communication Technology (Official Gazette - 109/02):

- Young people being trained for life in a society of knowledge and lifelong learning;
- The modernization of curricula related to ICT at all levels of education;
- Training and in-service teacher training for the application of ICT in class;
- The systematic equipping of all schools according to an established standard of computer and communication equipment;
- The use of material and human resources in schools for the basic computer training of adults in the local community.

These goals are realized on the basis of implementing the documents and action plans of the Ministry of Education and Sports and the Ministry of Science and Technology.

Mainstream Classes/Optional Classes

Students of the higher grades of elementary school acquire ICT knowledge in their mainstream classes (subject: technical culture) and in optional classes (subject: computer science). In secondary schools (general education and vocational schools), computer science is a one-year mainstream subject (70 hours); in addition to this, it also exists as an optional subject. Most teacher training faculties include subjects related to computer science and to the application of computers in class.

New ICT curricula

New curricula are currently being completed for elementary and secondary schools, which include more extensive content, knowledge and skills in the area of ICT.

Net in the School

In 2001 (Croatian Telecom donation to Ministry of Education and sport):

[76] http://www.cobiss.org/

- ISDN connection of all 1366 primary and secondary schools to Internet
- Donation of 1000 PCs. In 2003 (Croatian Telecom donation to Ministry of Education and sport).
- 100.000.000 minutes Internet sessions for each primary and secondary school, free of charge
- 10 hours of Internet usage for each primary and secondary school, free of charge.
- Donation of 700 PCs
- Teacher's Info Portal

Software Licensing

Microsoft Subscription School Agreement, Antivirus Protection School Agreement.

Syndicated e-procurement of ICT

Syndicated e-Procurement of ICT equipment started in 2001 (through Office for the Internet Infrastructure Development), based on standardized equipment and resulting significant decrease of unit price (approximately 40% lower to street prices)

Portables and LCD Projectors

300 Portables and LCD Projector Completes for the Secondary schools.

Regional ICT Education Centers

6 Regional ICT Teacher Training Centers.

Teach the Teacher Program

By the end of 2003, there were 29.184 Elementary-school teachers. The training of computer science teachers includes seminars/workshops on the application of ICT in class.

A large, national project has been initiated which in the next 3-4 years will involve most elementary-school teachers in courses (80 hours) where they will be trained to apply ICT in the teaching of different subjects.

For this purpose, 6 regional teacher-training centers have been established for the training of elementary-school teachers and other employees in education.

Digital Content

Individual and/or group initiative of school professors realized predominantly in Web page technologies. Dominance of informatics and natural sciences.

LMS

Learning Management System is not applied in any school production system by the end of 2003. IT-Centar uses a proprietary production-grade LMS implementation for professional ICT education.

Distance Learning

Examples of good practice in learning have been recorded in some small schools on islands, in the e-schools project of the Croatian Society of Natural Sciences, in adult education ("Birotehnika" Centre for Correspondence Education) and in the education programs of the Serbian Cultural Society Prosvjeta for members of the Serb national minority.

The elaboration of a project on distance learning by computer is underway, and is devoted to the learning - education of children living on medium- sized and small islands - in four Croatian regions (the Kvarner, Zadar, Šibenik and Dubrovnik regions), and in isolated mountain villages and hamlets.

National Grid for Learning

Implementation strategy for the National Grid for Learning has been accepted by the Government Steering Committee for Internetization in 2002.

There is ongoing activity on Functional Specification definitions for e-School aligned with corresponding international standards and interoperability.

Start of real implementation is heavily dependent with the start of implementations of Common eGovernment Infrastructure (Government Network, National Smart Card, Institutional Entities for ICT in Education), and has not been started by the end of 2003.

Centralized e-Payroll and administrative System - Pilot Project

Due to Agreement with Government and Financial Institute (FINA), Pilot implementation of centralized Internet based Payroll and Administrative System for schools in Karlovac County (Karlovacka upanija) has been implemented.

3.8.3.2. HIGHER EDUCATION

Networked higher education institutions

The higher education system comprises five universities (the University of Zagreb, the University of Rijeka, the University of Osijek, the University of Split, the University of Zadar) with some eighty faculties, art academies, four-year colleges, university departments and degree programs, seven two-year colleges (Zagreb, Karlovac, Rijeka, Split, Dubrovnik, Po ega), six independent four-year colleges, thirteen private accredited four-year colleges and one private accredited two-year college. Around 65-70% of those who complete Upper secondary education enroll at higher education institutions. In the school year 2002/2003 there was a total of 47,225 students enrolled in first semester of university education. There were 116,434 students at higher education students.

There were 8,132 Higher-education teachers by the end of 2003. CARNet

All higher education institutions are connected to the Internet through CARNet - Croatian Academic and Research Network. CARNet is fully funded from the budget of the Ministry of Science and Technology. The speed of connection ranges from 2 to 622 Mbps. The full cost of connection is covered through CARNet.

In 2003, CARNet increased the throughput of the national backbone to 2Gbps. The procurement of the equipment is realized through public tenders and the Ministry of Science and Technology pays the supplier after the equipment has been delivered

The Ministry of Science and Technology provides funding for the procurement of software and on-line databases for university libraries within the project Scientific Information System. This project makes online databases available to both students and teachers in all research-teaching institutions. The project is being implemented by three ministries: the Ministry of Science and Technology, the Ministry of Education and Sports, and the Ministry of Culture. The aim of the project is to create a common network integrating all higher education institutions, primary schools, secondary schools and public libraries using standardized computer equipment and software. All university libraries are connected to the Internet through CARNet.

e-Learning

The Ministry of Science and Technology provides the information-communication infrastructure for distance learning through support to the development of guidelines and the organization of referral centers for e-Learning programme support and methodology, by setting the

standards of teleconference rooms (TCRs), and by purchasing the necessary computer and software equipment for universities. These activities are implemented by the Croatian Academic Research Network - CARNet.

The contents covered by the referral centers include the selection of courseware tools, the production of educational material, the selection of computer and programme support for the application of IT in class, the reporting of distance learning projects, the production of multimedia elements and their adjustment to the worldwide web, methodic and communication in distance learning, and self-evaluation and knowledge assessment with the application of IT.

Until now, six Teleconference Rooms (TCRs) have been established in Osijek, Rijeka, Split, Šibenik and Zagreb. By the end of 2003, it is planned to build another nine TCRs in Dubrovnik, Osijek, Pula, Rijeka, Vara din, Zadar and Zagreb. TCRs provide support to distance learning and teleconferencing, the transfer of video recordings on the Internet, and the production of educational digital video contents for later online access.

Distance learning is also included in international projects, such as the TEMPUS and EUREKA programs. Several Tempus projects include modules to which distance-learning methodology is applied. These are mostly regional projects which involve more than one Western Balkan country, and which are coordinated by an institution of an EU member state. These are, for example:

- European study for Western Balkan countries coordinated by Salzburg University;
- The establishment of the postgraduate study of tourism coordinated by the higher education and technology institute in Thessalonica;

The education of judges in Croatia, and Serbia and Montenegro, has been initiated with the aim of creating a European Legal Area, a project coordinated by the University of Bologna.

Regarding the EUREKA programme, Croatia was one of the co-founders of the EUROLEARN umbrella project within EUREKA. The project has gone through its pilot stage and is now in the phase of full implementation. Although e-learning culture is not well developed in Croatia, it is becoming increasingly accepted. In technological terms, as well as in terms of staff capacity, Croatia does not lag behind the European Union in the production of e-learning. The problem lies in introducing technology for general use, which, due to technical equipment requirements, demands additional investment. The pilot projects implemented so far have been successful.

Digital Content for Education

First implementations of Digital content for education on standalone electronic media (CDs) and/or as Web pages were based on individual activities and initiatives. Attractive implementations are coming from individuals in natural sciences.

Programs and Incentives through Ministry of Science and Technology/CARNet have resulted in weak acceleration in digital content creation.

Distance Learning

Distance learning is not sufficiently represented in educational levels preceding higher education, although its significance is being increasingly recognized. Currently, there are only a few institutions and professional associations that offer these services.

Distant Learning is organized and implemented in the Institute for Educational Development of the Ministry of Education and Sports in cooperation with the Ministry of Public Works, Reconstruction and Construction. The project is currently in the phase of the elaboration of a methodic-methodological model, after which the software for individual subjects and areas will be produced.

It is expected that these projects will at least alleviate the emigration of the population from these areas. The programme will be posted on the web, so that all the geographical regions of Croatia will have access to it. A more significant expansion of this form of education is planned for the future, The Ministry of Education and Sports supervises the work of institutions within the education system by approving individual programs, which must match the goals of the curriculum.

Within the higher-education system, distance learning has just been introduced at some institutions of higher education, although this form of education has been envisaged by the higher-education reform, for which funds will be provided from the state budget.

Smart card/X-Card

Implemented for higher education students from 1999. Functionality improved in 2002/2003.

Information System for Higher Education (ISVU)

Full Functional Student Service Administration Information System for Higher Education, started as the Pilot project of the Ministry of Science and Technology, Developed at the Faculty of Electric Engineering and Computing and hosted by SRCE - University Computing Centre - Zagreb, it is now in deployment phase, for more then hundred higher universities, 117.000 students, 5.500 teachers, 12.000 courses, 100.000 exams/year, 400.000 different issued documents, consolidated reporting.

3.8.3.3. PROFESSIONAL ICT EDUCATION

ECDL in Croatia

Based on Croatia ICT Strategy Recommendation, CITS - Croatian Information Technology Society signed the Agreement for implementation of ECDL Program in Croatia with European Computer Driving License Foundation - Dublin in September 2003.

In the ongoing process 14 Training and Testing Centers were authorized in Croatia by the end of 2003. European Computer Skills Card (ECSC) is provided as the internationally recognized certification document.

Cisco Academia

Dedicated Educational Cisco Programs is realized through existing educational institutions (SRCE, CARNet, Faculties/Universities, some vocational schools), or independent ICT education centers.

XML Academia

Technical University Zagreb is finalizing curriculum for XML Academia. Implementation is expected in 2004.

Professional ICT Education Centers

IBM Education Center, IBM Certified Education Centers, Oracle Education Center, Microsoft Education Centre, Microsoft Certified Centers. Institutional (SRCE, CARNet, etc.) and private centers (IT Center, Algebra, etc.) are giving services in professional ICT education and training. Some of them are certified partners for education and training with Software vendors.

3.8.3.4. SCIENCE AND RESEARCH

Croatian Programme for Innovative Technological Development

Croatian Programme for Innovative Technological Development (HITRA), Guidelines for the Implementation of the HITRA Program: Involving the Potential for National Scientific Research, adopted by the Government of the Republic of Croatia on April 5, 2001, Regulation on the Procedure for the Implementation of the Program for Development of Knowledge-Based Companies, (OG 33/2001), and the Foundation of the Interdisciplinary Control Group for the Implementation of the Croatian Program for Innovative Technological Development (HITRA) (OG 108/2001).

Institutional framework for technology development includes following institutions defined by the HITRA program: Research and Development Technology Institute, Research and Development Centers, Technology Innovation Centers, Business and Innovation Centre of Croatia (BICRO).

The Business and Innovation Centre of Croatia (BICRO) was established in 1998, as a state agency to assume a role of an umbrella institution in the creation of the overall technology infrastructure. After launching the HITRA Program, BICRO has been entrusted with the implementation and coordination of the Program for supporting knowledge-based companies in cooperation with the technology centers. Due to the maturing and developing of the whole system, BICRO is currently under reconstruction towards an institution investing into technology-based companies (introduction and development of new technologies) technology capabilities of companies (productivity/quality) and risk capital, in case that the legal conditions have been fulfilled.

The Information and Communication Support of Science

The Ministry of Science and Technology has been procuring computer equipment and setting up local area networks for institutions of higher education and scientific institutes, and has financed the connection between the Croatian Academic and Research Network (CARNet) and GEANT, bringing its node to Zagreb in spring 2002. By connecting to GEANT, CARNet has resolved an old problem with small international bandwidth capacity. Technical infrastructure for start-up of Gigabit CARNet is finalized by the end of 2003. CARNet network is a data network intended primarily for the transfer of data by using the TCP/IP protocol (Transport Control Protocol/Internet protocol). This protocol is an agreed standard for the widest computer network of today - the Internet. The currently supported version of the TCP/IP protocol on the greater part of the Internet network as well as in the CARNet network as integral part of the global network is version 4 (IPv4). CARNet network has established this link through the GEANT network, at a current link speed of 1.2 Gbps. The GEANT network is a result of the European Union initiative and the society of European academic networks to establish the technologically most advanced computer network that would connect all the European academic and research national networks and at the same time to establish also the link to the commercial Internet.

CARNet and SRCE provide the Croatian scientific community with hardware and software resources for advanced computer and information use.

The Ministry has financed the Scientific Information System (SZI), which tends to facilitate the networking of scientific libraries in Croatia, particularly of sibling libraries regardless of their organizational and physical setup. The system will have a uniform user interface for all libraries. SZI includes a Centre with on-line access to international databases with science literature and e-journal collections. Croatian scientific literature is available through the Croatian Scientific Bibliography (CROSBI). This database includes all scientific publications by Croatian authors since the early 1990s. It provides the basis for a follow-up and evaluation of results of scientific projects.

Science in Information and Communication Technology

The Ministry of Science and Technology has financially supported scientific projects that involve junior researchers. Their number has increased several times since 1999, and now it is 2,200. A junior researcher is offered a limited duration appointment to work on a project and obtain a master's or doctoral degree.

Since the autumn 2002, the Ministry of Science and Technology has been financing a new generation of scientific projects (including ICT projects). These projects have been divided in four science fields: natural sciences (computing branch of mathematics), technical sciences (computing, telecommunications and information science), social sciences (information science) and liberal arts (information science). The Ministry is seeking to overcome the gaps between these projects through collaboration between them.

Projects applying Information Technology

The Ministry of Science and Technology has allocated funds to finance iProjekti (iProjects) - projects applying information technology. These projects have been financed for four years in a row. The proposals are usually evaluated, selected, financed and monitored on a one-year basis, much like scientific projects. Unlike scientific projects whose aim is to obtain and publish relevant scientific findings, iProjekti are intended to produce operational software products (digital textbooks, web portals, knowledge bases, computer systems, and software packages).

Over 120 projects have been financed and about 80 have been completed. Their authors usually come from scientific and higher education institutions. The Ministry of Science and Technology has obtained ISO 9001:2000 Quality Management System Certifications for the management of iProjekti.

Technology Innovation Centers

Infrastructure institutions founded by academic institutions and supported by the local government and economic entities. They are aimed at materializing ideas, innovations and research results arising from scientific research projects funded from public or private sources. In terms of organization, Technology Innovation Centers are incubators for knowledge-based small and medium-sized enterprises, and not for traditional entrepreneurial undertakings. There are four technology centers:

- Centre for Technology Transfer (CTT), Zagreb, founded in 1996
- Technology Centre Split (TCS) founded in 1996
- Centre for Innovative Technology Rijeka (TIC) founded in 1997
- Technology and Innovation Centre, Osijek, founded in 2003.

CRO GRID projects e-Science Infrastructure)

GRID Infrastructure (5 interconnected GRID Test beds: 2 Computing Clusters in Zagreb, 1 Computing Cluster in Osijek, Rijeka and Split. CroGRID Infrastructure implementation is headed by University Computing Centre Zagreb).

GRID Middleware Project (Faculty of Electrical Engineering and Computing and Ericsson Nikola Tesla: Code name - MidArc) has been started. First results have attracted CERN GRID developers.

First started projects in GRID Applications are in Chemistry, Physics, Geology, Transportation, and Medicine.

3.8.4. MACEDONIA

In Macedonia there are several degrees of education: eight years of primary school, high school of 3 to 4 years and high education of 4 to 5 years depending on the studies. In addition to this, universities offer postgraduate studies in several areas for obtaining Master Degree and Ph.D. titles. Apart from the institutions of the regular part of education, there are institutions and centers offering Vocational Education and Training and courses in different areas, as Life-long Learning and In-service Training.

There are 397[77] primary schools in Macedonia, with an average of 2 computers per school. Still, the primary school teachers rarely possess IT skills, and the number of computer users in the educational process is even lower. The curriculum, which is unified for all the students, anticipates having IT related subjects in 7 and 8 grades, but because not all the schools have personal computers, these lessons are taught only in those places where there are conditions for that (at least 7-8 computers in a classroom). Still, even in those places that these lessons are tacking place, there are no comprehensive software packages included in the lectures. The lectures are given by relatively trained teachers, and the curriculum probably needs to aim at the general IT skills (e-mail, web, PC usage for writing, drawing) and there is no particular reason for studying QBASIC for DOS, as it is done now. This shows that the primary school curriculum is obsolete and that the Education Development Bureau dealing with the evaluation of the primary school curriculum should accelerate its adjustment with the real needs of the students, technologies and the society. The reason for the study of the old curriculum (for example DOS, there is no Internet connections and no Internet usage) lays in a great deal on the outdated hardware platform of the current IT equipment, i.e. the computers are more then 5 years old, and there are no resources for their upgrade (or it cannot be implemented) or for the purchase of new equipment from new technological generations. The schools mainly manage on their for the purchase and maintenance of the equipment, using some donations by the foreign organizations, enterprises from their local self-government units, within the frameworks of some program, but still, it is difficult to find resources.

	No of schools	No of computers	Average
Total	269	4795	17,83
Basic Sshools	133	1289	9,69
High Schools	77	1258	16,34
Faculties	59	2248	38,10

The situation in the high schools is somewhat better, at least regarding the access to computers by the students.Ninety high schools in Macedonia with around 93.000 students have an average of 40 computers, which means around 3.700 PCs. Most of these computers are received as a donationof the Republic of China (2000 PCs), which through USAID project called (e-School.mk) should be installed in all the high schools in Macedonia.

The "e-School.mk" activity is a product of this new direction in Macedonia. This USAID/Macedonia dot-EDU project is preparing Macedonian youth for employment through ICT-informed education programs and improving quality and relevance of instruction at the secondary level. The overall dot-EDU projects goal is to assist the Ministry of Education and Science in order to:

- Assess the condition of current ICT in Macedonia and the strategies available to make use of computer labs and build on community/NGO/private sector relationships in the effort to improve the condition of teaching and learning.
- Take advantage of the contribution of 2,000 computers by the Chinese Government (PRC) and provide cables, networking, and install computer equipment in secondary schools.
- Expand the use of ICT in primary schools in effective and engaging ways
- Enhance the existing curricula with the use of ICT materials, especially in science and technology courses, as well as courses where there is a lack of experienced teachers
- Improve and expand teachers' ability to teach core ICT skills and to use ICT to enhance teaching of other subjects
- Establish plans and practices to help ensure sustainability of schools' computer labs

The "e-School.mk" activity has taken the donation of 2,000 computers from the Government of Republic of China to the Government of Macedonia and created a nationwide buzz among students, teachers, administrators and government officials. At the epicenter of this excitement are plans to fully equip computer labs in every secondary school in the country. These labs will receive substantial technological inputs such as software, peripherals and additional hardware. Participating educators will build capacity in integrating ICTs across the curriculum, rather than treating ICT as a distinct and separate subject. They will also learn how to use ICTs to help shift from traditional teaching methods to more student-centered learning.

The Education Development Center (EDC), the Academy for Educational Development (AED), World Links, along with Macedonian teachers and parents, are developing the most innovative uses for the labs, and are working to ensure their sustainability beyond the life of the project.

After students develop basic computer literacy, an ICT for education program will promote active learning, critical thinking, and work-based learning through new software and project based learning strategies. In addition, several secondary schools that specialize in vocational education will integrate Internet connectivity and local business competitiveness clusters to develop skills that are of value to local businesses. Ultimately, this project aims to improve learning through ICT-informed education programs while effectively building student skills in using ICTs that prepare them for university, entrepreneurship

[77] Source: Ministry of Education and Science of Republic of Macedonia, Vlado Vasiljevski, IT Counselor, 2004

and new job opportunities.

There is intention to extend the "e-School.mk" project for the primary schools in the country too, and this should start as a project probably in the fourth quarter of 2004.

Still, the computer usage during the lectures is very rear, and is based on the enthusiastic initiatives of the professors themselves.

Students have regular lectures involving IT in their first and third years of high school --- where they study Windows Office, programming languages (Pascal and Delphi), and use of the Internet. The lectures are given by dedicated highly educated teachers in that field, and, since all the high schools have equipment, the expectations are that in the future all of the students will receive the necessary basic IT knowledge. Still, lessons involving IT study should be more extensive, and they should be included in all the 4 year of the educational process.

Although not all the high schools in Macedonia have Internet, there is a growing trend for that with the project "e-School.mk". Even in those schools that have Internet connection there is no Internet access on lessons other than information science lessons, where the basics of Internet work and e-mail usage is being studied. This is mostly due to expensive dial-up connection.

There are three universities in Macedonia: St. Cyril and Methodius in Skopje with 24 faculties, 10 scientific institutions and 6 associative members; SEE University in Tetovo with 5 faculties and two other academic units; and University "St. Kliment Ohridski" from Bitola with 5 Faculties, one High school and 3 Institutes. At allthe faculties, 40.000 students have lessons on the basics of the information science at the beginning of their college education.

There are educational programs for IT experts only on two universities - Skopje University and the University of Tetovo. The Faculty of Electrical Engineering in Skopje has a Department for computer science, information technology and automation sector. Approximately, 100 electrical engineers graduate after nine semesters on an annual basis with a major of computer engineering.

Another sector on the same Faculty is the Department for electronics and telecommunications. This sector graduates approximately 70 electrical engineers per year after nine semesters.

The Institute of Information Technology on St. Cyril and Methodius University operates under the Faculty of Science and Mathematics. There are two sectors on this institute: one for software engineering, and another for theoretical foundation of IT. Fifty students graduate after eight semesters.

At the SEE University, there is a Department for Computer Sciences.

However, the bad economic situation in the country and the small chances for employment force a great part of these graduates (according to some assessment around 50-100 a year) to leave the country in search for their prospect abroad.

The university computer network (UCN)[78] of the University "St. Cyril and Methodius" in Skopje was established in 1993.

With the foundation of MARNet (Macedonian scientific and research-academic network) and with the Internet connection at the University, there is a growing need for upgrade and extension of the networks capacities, which was done on several occasions in the last period. The older DIGITAL direction equipment was replaced with modern CISCO equipment, and DECnet directed protocols were replaced with modern ones, based on TCP/IP equipage of protocols. The Internet connection is 1Mbps[79] and the intra communication is very good. Some faculties have re-built their web sites and have started with some courses based on of e-education. Under the UNESCO, the project should improve scientific cooperation between SEE countries and propose a general reconstruction of the network, reaching a speed of 622 Mbps - 2 GB.

Currently, 4 projects are run within the frameworks of the UKM and MARNet activity:

- SEEREN project (http://www.seeren.org). The objective of this project is establishment of international connection of the academic and research networks in the countries from the region of Southeast Europe (Macedonia, Serbia and Montenegro, Albania, Bulgaria and Bosnia and Herzegovina) with the pan-European academic and research network - GEANT, thus creating conditions for their future full-pledged accession in GEANT. This project is carried out under auspices of the academic network of Greece - GRNET, one of the points of presence of GEANT. The set speeds of the links are going from 2 - 34Mbps, the duration of the project is one year.
- In regard to Macedonia, an international link with Athens with a capacity of 4MBps was established. By the activation of this link the capacity of international connection on MARNet increased 5 times, which represents significant improvement of the performances of now congested network. During this project the academic networks - users and participants in the project should consider all the possibilities, i.e. they should provide sustainability of the connection after the termination of the financing by the project within the frameworks of the planned budgets of the responsible institutions in the countries.
- MARNet SKOMAN project of the NATO scientific program. As the title itself suggests (Skopje Metropolitan Area Network) this is a project for construction of communication-information data network in the area of the city of Skopje, and it should be used for improvement of the connection inside the University network. It is well known fact that neither the quality nor the accessibility of the current links within the frameworks of UKIM meets the current needs, and besides, there are a great number of unconnected members. The realization of this project should give an answer and solution to this problems through:
- The construction of wireless radio network on the University
- The purchase and installation of active network equipment
- The grant by the Austrian government for construction of optic infrastructure on UKM and MARNet in the city of Skopje
- the TEMPUS Project for modernization of the public administration at the University

Professional IT programs and also different levels of computer courses are also held by a number of private companies and authorized training centers, such as: Microsoft authorized training center, Autodesk authorized training centers, Cisco Academy, etc. It is important to say that also some international donor institutions based in the country has a significant contribution in improving of computer literacy amongst the people. UNDP through 19 ICT Centers established in 19 different municipalities in the country (5 of them in rural municipalities: Dolneni,

[78] Source: St. Cyril and Methodius University Skopje, http://www.ukim.edu.mk

[79] A Strategy to Develop the Information Technology (IT) in Macedonia with special reference to the Software Development, GTZ, 2003

Sopotnica, Miravci, Rostuse, Lipkovo) has trained about 17,000 trainees for basic and advances computer courses. The beneficiaries are the municipality's administration, youth, unemployed and students. Besides the role of the IT education, these 19 ICT Centers play a role of free Internet Access point in their communities.

In Macedonia So far, educational centers for Xpert programme are organized in 7 locations: Veles, Kumanovo, Bitola, Prilep, Strumica, Stip and Negotino, in the Workers Universities. About 250 trainees passed the Xpert courses, starting from October 2002 year. There is an initiative that 19 ICT Centers in the country established by UNDP to become also educational centers for Xpert programme.

Different initiatives started in Macedonia 5-6 years for commencement of certain activities in the field of distance learning. The most that has been done in that respect is by the Electro-technical Faculty in Skopje within the University St. Cyril and Methodius, with the Centre of distance learning from 2001, offering online courses of: 1) data base, 2) distributed computer systems, 3) UML etc. There is also "System for automatic testing of programming knowledge", a "Digital Library", and a "Virtual Laboratory".

Based on some surveys there are citizens that are using e-learning services (distance learning) from foreign providers.

Institute of Information Science within the Faculty of natural sciences and mathematics - University St. Cyril and Methodius has a very interesting web-based solution of the "Systems of electronic testing and passing exams" which is used for passing exams and giving grades for several subjects.

In September 2002, an e-Business Department has started on the Faculty of Economics - St. Cyril and Methodius Skopje, which will prepare students for career in international business giving emphasis on disciplines in which Information and Communication Technology (ICT) plays crucial role such as: Internet Marketing, Web Presence and Management of e-business.

On the web-site of the People's and University Library "St. Kliment Ohridski" in Skopje there is a system for search of mutual data base COBIB.MK, or other data bases available through COBISS/OPAC, where the readers can find some works of interest through the Internet catalog.

3.8.5. MOLDOVA

3.8.5.1. ABOUT THE SYSTEM OF EDUCATION

According to the Law on Education, the system of education in the Republic of Moldova is organized into levels and stages. The system of general secondary education has two levels: gymnasia and lyceums. There are three types of training institutions, which prepare the youth for the labor market:

- Institutions providing secondary vocational training,
- Institutions of secondary professional education (colleges),
- Institutions for higher education.

The system of secondary vocational training includes 83 institutions, which teach 22.6 thousand students, of which 3.6 thousand (16%) pay for their studies; 65% are from rural areas; over 80% are graduates of gymnasia.

Secondary professional training in the country is ensured in 63 colleges. The number of students in these institutions makes up over 15,000. Greater part of these students (82%) study in public colleges. The teaching language for three fourths of college students Romanian; for one in five students- it is the Russian language. For the rest, the teaching languages are Ukrainian, Gagauz, and Bulgarian.

Accessibility of university studies has grown, especially in private institutions, this being the only level in the system of education that reports a considerable increase in the number of institutions - 24 in 1996-1997 and 45 in 2001. In early 2003/2004 scholastic year there were 40 higher education institutions with over 104,000 students, of which over 10% in ICT or related departments.

Majority of students study in Chisinau municipality - 83,100 (87%), in Balti municipality - 7,100 (8%), in Cahul municipality - 2,700 (3%), in Comrat municipality - 2,100 (2%).

Exchange of students with foreign countries takes place annually. In early 2002/2003 school year higher education institutions of the country had 2,000 students from 30 countries, most of them from Ukraine (28%), Romania (22%), Jordan (18%). Over two thirds of foreign students pay their tuition. The number of Moldovan citizens who study in higher education institutions abroad is bigger - 4,000 persons, with most of them (72%) in Romania.

Scientific training is ensured in over 48 institutions, of which 33 are research institutions and 15 higher education institutions. The number of PhD students is over 1,500 persons, most of them are youth. Of the total number of PhD students, 59% are women. Yearly, about 15% of them uphold their doctoral theses.

The number of unemployed aged 16-30 years (by the classification of the International Labor Organization) was 48,000 persons in 2002, or 44% of the total number of unemployed. The reported rate of unemployment among the youth (rate of the unemployed among the active population) is 12.0%, which is almost twice as much compared to the country's average (6.8%), being much higher in urban areas (18.9%), compared to the rural (7.2%). Compared to the year 2001, the unemployment rate fell by 1.1%.

Of the total number of the unemployed registered with the regional labor force agencies, 48% are people younger than 30 years.

The number of students who pay for their tuition shows a steady growth. This indicator grew by 3% compared to 2002, and is 80,100 persons, or 77% of the total number of students. Maximum reported amounts of annual tuition fee per student are 7,000 - 9,000 lei for daytime students and 3,000 - 4,000 for studies by correspondence.

Recent years have seen trends towards increase in the number of students per 10,000 inhabitants (by 59% compared to 1997). By the number of university students per 10,000 inhabitants the Republic of Moldova can compete with such developed countries like Germany, Japan, Bulgaria, Hungary and Romania.

The university institutions employ 5,700 teachers, of whom 2,100 (37%) are doctors of sciences, and 400 (6%) hold the degree of Doctor Habilitat.

3.8.5.2. INFORMATIZATION IN PRE-UNIVERSITY INSTITUTIONS

Long-standing efforts of the Ministry of Education, and in part, of the Ministry of Labor and Social Protection, enhanced by Government support and some foreign donors, brought about some improvements in teaching basic informatics skills to pupils, students and, in several cases, some other social groups. Further considerable contribution was made when in 1997-1998, 821 pre-university institutions of Moldova were equipped with computer labs (among them primary schools, secondary schools, gymnasia, lyceums, vocational schools, polyvalent schools, colleges). However, these labs have not been upgraded ever since, which does not enable the schools and lyceums to maintain, at least, already acquired informatics facilities for training in these institutions. Some of these 821 institutions (72 in 2001) are connected to Internet.

Although situation at pre-university institutions is hardly satisfactory, the observable trend inspires some optimism.

The following table gives
the set of basic hardware indicators for education sector.

	Indicator	Units
1	Number of PC in pre-university institutions	9067
2	Number of schoolchildren	607 367
3	Number of schoolchildren with informatics as subject of study	277 571
4	Number of laboratories	818
5	Number of PC with Internet connection	508
6	Number of Universities with informatics and IT as subject of study	29
7	Number of students in informatics and IT	9845
8	Number of PC in Universities connected in network	3544
9	Number of Universities' PC with Internet connection	3268

With all recently undertaken efforts in the Republic of Moldova, still one computer is used by 64 pupils. The available facilities and professional training of teachers, as it has already been emphasized above, does not contribute sufficiently towards improvement of pupils' skills by using a computerized educational system (almost 66% of respondents interviewed during the survey support this opinion, and 3.6% are not aware of the situation). Two thirds of the interrogated believe that the quality of educational programs is low or absent at all, and almost a half of the respondents are sure that there is no program to enable use of ICT for training purposes of adult population with low incomes, the other more than 34% are aware of the situation.

In this context, the program "Salt" ("Advance"), which provides for equipment of all schools with computers and Internet access during 2004-2005, is very urgent, important, though rather bold.

Besides, the program provides for installation of computers in all pre-university institutions, territorial Education, Youth and Sports Departments, as well as creation of Information system of education management and of a specialized site. The first stage in development of the program "Salt" envisages connection of all schools in Chisinau municipality, Balti and regional centers to Internet. At the second stage, the Joint Stock Company "Moldtelecom" shall ensure Internet access to all schools in rural areas.

3.8.5.3. INFORMATIZATION IN HIGHER EDUCATION AND RESEARCH INSTITUTIONS

The matters are a little better at the universities, where the informatics support to the training is ensured, largely, from their own financial resources. Accessibility of Internet services has been significantly improved through the works of the Soros Foundation Moldova project, which was aimed to establish an interuniversity network Moldnet. This interconnected the local networks of the State University of Moldova, Technical University of Moldova, Academy of Economic Studies and Academy of Sciences of Moldova, enabling also Internet access through a server of the Soros Foundation Moldova that was further reorganized into the DNT Association.

Today, parallel to the DNT, there is another association - "RENAM" (www.renam.md), organized in June 1999 - that extends Internet services to the academic and university institutions.

The "RENAM's activities has as its principal purpose the constant development of communication and information infrastructure of the scientific and educational community, as well as governmental organizations in Moldova.

The Association is open for every scientific and educational body in Moldova, which is interested in its networking and information resources. The aim of the Association is to establish and develop computer network and information services on a modern level mostly in higher and secondary education, research institutions, libraries and public collections. Furthermore, the continuous and active participation in the work of international computer network organizations is also set as an aim. The program is supported by the following organizations: NATO Science Programme Committee, Ministry of Science and Education of Moldova, Academy of Science (ASM) of Moldova and leading universities. The foundation of the infrastructure is the IP backbone in Chisinau, the Central communication Node for providing external connections and interurban links to the nodes in peripheral cities of Moldova.

RENAM network is providing services for scientific and educational organizations, personal members of scientific - educational community of Moldova. Projects connected with the development of Academic

information infrastructure in Moldova have been sponsored by:

- NATO Science Programme Committee;
- Soros Foundation in Moldova;
- UNESCO;
- EURASIA Foundation.

Currently, more than 2400 users, working in 12 organizations, make use of RENAM facilities. 350 workstations, personal computers and 9 servers operate in the net. Employs of 4 universities, 25 science institutions, 11 colleges, 6 libraries, and 4 public organizations use RENAM resources. RENAM has peering agreements with some principal Internet Service providers in Moldova.

New Intranet/Internet technologies are actively developed in the scientific and educational spheres. Basic networking and information technologies are elaborated now in the Academy of Sciences and leading universities of Moldova.

Networking infrastructure for science and education in Moldova development passed several stages. Initially many scientific and educational organizations in Moldova developed their internal networking segments separately, as independent sub-networks, but soon the real needs of scientific-educational society have required uniting these efforts. An organization of collaborated activity can be subdivided in some stages and the first practical results were obtained in 1996, when the Moldavian Department of Soros Foundation together with the Academy of Sciences of Moldova and the leading Universities proposed an initiative of creation of scientific-educational network Moldnet. Soros Foundation in Moldova supported this initiative and practical realization of the project began. The institutions of the Academy of Sciences, of the State and Technical Universities, and the Academy of Economic Studies of Moldova were originally the participants of the project and main users of resources of Moldnet. Later on many colleges, Lyceums, secondary schools of Kishinev were connected to Moldnet. The Moldnet project was oriented on the use of radio-modems connections inside Kishinev. Now the central node of Moldnet has some connections to Internet through satellite and terrestrial channels.

The Academy of Sciences of Moldova internal network ACAD development beginning dates back to 1995, when the first networking facilities were deployed to let researchers send e-mail and files to each other, and leased telephone channel for Internet connection became available. In 1997, the Academy of sciences of Moldova elaborated a project of development of computer network AMNET (Academy of Sciences of Moldova Network), which is to provide the Academy research institutions with the internal communication, regional information exchange with leading Moldova Universities and the improved access to Internet.

The AMNET project supplements and expands ideology and basic principles of realization, being the basis of Moldnet creation. The project initially planned to be fulfilled in three stages. At the first stage the main structure of highways for connection of the ASM principle scientific organizations must be realized and more data links to provide an access of scientific and educational institutions of Moldova to Internet must be organized. Joining up of the majority of scientific institutions, faculties and campuses of the leading Universities and other higher educational establishments of the Moldova capital into network "backbone" on the basis of the existing and additionally created leased channels, high throughput fibre connections and leased telephone lines for remote links is envisaged at the second stage.

The third stage of the project realization planned to provide the expansion of the Academic network structure on all the territory of Moldova, include of scientific and educational establishments in all large cities of Moldova.

At the end of 1998 a program of future development of scientific and educational networking infrastructure in Moldova was elaborated and negotiated with NATO Science Program Division representatives. All previous projects ideas were sustained, but the emphasize of this stage of project realization was made on forming collaborated networking activity of all educational and scientific community of Moldova and transforming created Academic network infrastructure into new independent national scale networking segment. All previously implemented network structures have become a part of national RENAM named networking segment. The accumulated experience of organization of information systems on the basis of the Internet/Intranet technologies helped to define the strategy aims of new network development program:

- Creation and development of the basis infrastructure (nodes and highways) of Academic network and providing a stable mutual access to national and foreign information resources;
- Elaboration of new information technologies in order to achieve a high level of investigations and close interaction with the European and the world scientific and educational community;
- Development of communication media for distance education systems deployment.

Internet connectivity and all other external communications links are organized through RENAM external access providing nodes. Several global Internet connections are available now for RENAM network users. RENAM network operates its own VSAT station; build due to support of NATO Science Programme Division. The second Internet access channel is created within "RENAM-RoEduNet networks direct link and gateway construction" project and radio - relay link to RoEduNet (Iasi, Romania) and further to Trans - European Academic network GEANT with 8 Mbps bandwidth is used now for this purpose. Two Mbps external connection is provided by Moldavian ISP Relsoft - MegaDat.Com. Additionally direct connections to Moldtelecom IX switch for local traffic exchange with all Moldavian ISPs and Moldnet network link of 10 Mbps capacity are used for information exchange with principal local ISP in Moldova at present."

Due to international organizations and foundations support and state financial funding RENAM Association has built and permanently developing its own internal networking infrastructure, which includes following networking segments:

- Main municipal area backbone of RENAM placed inside Chisinau city having 8 nodal access points;
- Link to the northern part of Moldova, connecting Beltsi city RENAM campus, with Beltsi state University as focal point;
- Link to the southern part of Moldova (under construction yet) to Cahul city. The south node will be created at Cahul Moldova - Rumanian State University.

The Academy of Sciences Institutes, leading Universities of Moldova, more than 10 colleges and some governmental establishments are connected now to RENAM access nodes. The educational and research networking infrastructure in Moldova connects 3 towns. Currently there are RENAM's Data Communication nodes in Chisinau, Beltsi and Cahul, the biggest cities of the Republic. Dial-up connections can be set up to UUCP/PPP/SLIP protocols from 8 Data

Communication access nodes in Chisinau and Beltsi. Direct link to "Relsoft Communications - MegaDat.com" ISP in Moldova, operates since the beginning of 2002.

RENAM Association and institutions-members of the networking Association are participants of a lot of national and international research and development projects, which requires computers data-intensive applications. RENAM is a participant in these Projects and Programs:

- Moldnet network project
- Distance Education Projects,
- Soros Foundation in Moldova Scientific and University's Libraries Automation projects,
- Moldavian Library Consortium Information Systems Project,
- TEMPUS Projects in Moldavian Universities,
- UNESCO the Academy of Sciences informatization support project,
- UNESCO and EC DG XIII C STACCIS (Support for Telematics Applications Cooperation with the Commonwealth of Independent States) project
- EURASIA Foundation project "Academic Network Creation and modern electronic communications development"
- NATO project "AMNET - Development of the Science and Education Network in Moldova"
- NATO project "Networking Infrastructure development for Science and Education - RENAM (Research and Education Networking Association of Moldova) network"
- NATO project "RENAM network stage - II"
- NATO project "RENAM-RoEduNet networks direct link and gateway construction"
- NATO project Providing Satellite Internet Access for RENAM network academic community

All universities have one or more Internet sites (http://www.usmf.md/, http://www.utm.md/, http://www.ase.md/, http://www.usm.md/, etc.). At the Technical University every faculty have a site, sometimes the chairs, too (http://www.fcim.utm.md, http://www.ti.utm.md, etc.). The sites are in 2, 3 or 4 languages. There are many postgraduate courses (1 month - 3 years, second diploma, distance learning). There is a number of post-university training programs that extend various retraining and professional improvement courses (short-term), or offer a new profession (3 years of distance or by correspondence learning). The Moldova-Britain Centre for Training of Pensioned Servicemen, organized in summer 2003 as a common project of the Technical University and supported by the Great Britain's Defense Ministry, trains annually about 150 pensioned soldiers in administration of networks and databases.

Launched in June of 1998, the Internet Access and Training Program with USAID support (IATP http://www.iatp.md/) in Moldova provides Internet access and training for all citizens of the Republic of Moldova to ensure their professional and academic growth. Alumni of ECA exchange programs form the main target group as IATP seeks to encourage them to share the experience they accumulated overseas with the local population. The citizens of the Republic of Moldova can participate in a series of training courses that IATP offers free of charge. IATP provides audiences the opportunity to learn about the Internet and how it can serve as a valuable informational resource in professional and academic settings. For example, training courses show Moldavian lawyers how they can find information about Moldavian legislation on the Internet. IATP shows journalists how to find information on the Internet that they can use in writing news stories. Staff members of NGOs can benefit from the courses by finding out about the activities of other local and international NGOs that have the same mission. IATP regional sites: IATP Balti, IATP Cahul, IATP Causeni, IATP Chisinau, IATP Comrat, IATP Orhei, IATP Soroca, IATP Ungheni.

3.8.5.4. SOME DATA ABOUT RESEARCH & DEVELOPMENT

According to general information on research & development activities in Moldova, in 2003 such activities were carried out by 79 entities: 59 institutes for scientific research, 7 bureaus for construction projects, 4 organizations for projects and exploration, 9 institutions of higher education. Of the total number of organizations, 48% represent public sector, 39% - businesses and 13% - academic institutions.

In 2003 compared to the previous year, the number of organizations that pursued research & development activities grew by 3 entities, with the total volume of the executed works reaching 144.3 million lei (the amount practically did not change compared to the previous year).

Allocation of current costs for research & development by scientific directions is the following: technical disciplines - 38%; agricultural - 30%; natural - 19%; medical - 6%; humanities - 4%; social - 3%. Allocation of current costs by types of research is the following: fundamental - 33%; applied - 25%; development - 42%.

In 2003, the number of employees in research & development sector almost did not change compared to the previous year, and equaled app. 6,900 persons, with three quarters of them university graduates.

Of 5,000 full-time employees in research & development, 3,900 (78%) are employed at scientific research institutes, 700 (15%) - at bureaus for projects in construction and in design companies, and 300 (7%) - at academic institutions. Their age groups are the following: up to 30 years and older than 60 years - 15% each, 30-39 years - 17%, 40-49 years - 26%, 50-59 years - 27%.

Of the total number of PhD students, 974 persons (60%) are women.

According to the current bilateral agreements, there are 43 PhD students who study abroad (95% of them in Romania) and 62 take an internship (65% - in Romania, 18% - in France). Moldova provides PhD studies for 328 students from foreign countries, of whom 267 (81%) are from Romania.

The following table gives
the structure of financial resources in Research & Development:

Source	%
Beneficiary's capital	21%
Own capital	14%
Other (including grants)	11%
Foreign capital	2%
Extra-budgetary resources	2%

One in two researchers pursued scientific research and development work in natural sciences or technical disciplines. Of the total number of researchers 45% are women.

A special role for informatics training of the employees is played by private enterprises. Their leaders, aware of the strategic role played by informatics technologies and tools in their daily activities, organized ICT retraining and training courses for their staff. Moreover, they motivated development of informatics skills by their potential employees, making their choice in favor of sufficient informatics training of the young specialists. In spite of all these, majority of the population do not possess basic informatics skills to be able to use PCs and Internet.

3.8.6. SCG - KOSOVO

The usage of ICT in educational system of Kosovo is rising daily for both, educational and administrative purposes while the lack of connectivity in schools may lessen the chances for serious outputs. In addition to the scarce government spending, it is anticipated that during the past years, a considerable amount of equipment, mainly computers, has been donated to the educational institutions in Kosovo. The fragmented donor approach has made it very difficult to project the aggregate figures. In addition, the disparities between schools have risen noticeably. It goes worst from higher educational level to primary educational level and from cities to rural areas.

The total planned spending in education in 2003 was €80.5M or 16% of general government spending[80].

During the first years after the war in 1999, the educational system of Kosovo had put the priority on rebuilding the schools destroyed during the war. The reform of the educational system started almost at the same time. The process of rebuilding the educational system in Kosovo faced multitude of legacy problems inherited after a decade of a parallel educational system, during which the secondary and higher education were banned by the Serbia's authorities. It is obvious that this has left and continues to leave a mark on the quality of education including the specialist ICT education. The recovery of the educational system is proving to be an uneasy process but the massive amount of endeavor invested this far by the Kosovan society demonstrates eagerness for educational change and determination to successes.

The educational system in Kosovo is currently undergoing the most radical reform to date, which is aimed to bring it in line with EU standards - The Declaration of Bologna. This incorporates substantial reform of predominantly public educational structures at all levels, including redesign of the structure of studies as well as curricula reform. While this reform process is subject of intense debates, its' effects are already present, the most important being initiation of an increasingly transparent and continuous process of evaluation of the quality of studies.

The main areas of educational reform are: curriculum development according to labor market needs and with an orientation towards European standards; practice and action oriented teaching methods (as opposed to theoretical and teacher-centered teaching); introduction of evaluation, assessment and certification standards and of an accreditation system. (Education For Democratic Citizenship: From Policy to Effective Practice Through Quality Assurance - Country Report: Kosovo, July 2003).

However, for 2003, the budget allocation for the Curriculum Development was only €0.2 million. UNICEF Kosovo is the lead agency responsible for Curriculum Development, in cooperation with the MEST Section for Curriculum[81].

It is remarkable that the educational reform is being carried out in circumstances characterized by the shortage of facilities, overload by the high number of students and poorly paid teachers. Kosovo has the youngest population in Europe with more than 50% being under 24 years of age and one-third under 15 years of age[82], which presents enormous potential for development of Kosovo, provided the educational system will endure the pressure of the highest proportion of school-aged children in Europe.

Vocational Education and Training

The component of post-education and life-long learning is still struggling its way through the regular educational system. According to the EMIS data, there are 50 vocational and technical secondary schools. About 58% of the schools are clustered around the larger urban centers (Prishtina, Prizren, Peja, Mitrovica, Gjilan, Ferizaj, and Gjakova). The remaining schools are located in rural areas. There are (OECD) 16 courses (technical, economics, medical, agricultural, music, trade/industries, art etc.) with 107 profiles; the most common ones are general technical schools, economics schools and medical schools.

Within MEST there is The Other Education Department which has integrated four different programs: Special Needs Education, National University Library, Teacher Training and Curriculum Development. The 2003 Government budget appropriation for the Teacher Training programme was €0.23million. The Kosovo Educator Development Project (KEDP) funded with donor aid (CIDA) continues to be the lead programme responsible for teacher training and educator development.

In addition, the EU is planning to spend in Kosovo €2 million on a 2-year VET project, alongside the Ministry of Education, Science & Technology and Ministry of Labour and Social Welfare. The new project will develop VET curricula in sectors which will be defined as a result of a current labor market analysis. It will also establish a central vocational guidance resource center in Prishtina[83].

Specialist education for ICT experts.

Specialist education of ICT experts is being conducted mainly at the universities. The biggest university in Kosovo, University of Prishtina (UP), has currently two departments to offer specialist education for ICT experts; the Department of Electrical and Computer Engineering and the Department of Computer Science. Around 500 students enroll each year in engineering and computer science programs in these departments. The high demand for higher education and for ICT training in particular, has brought into scene a number of private universities, the most important being the American University in Kosovo. It has to be noted that given the fact that Accreditation Agency of Kosovo has not been launched yet, these universities work under interim licenses from MEST in addition to their native country accreditation. Thus, they usually offer both; local and their native country degrees. While the diplomas earned are certainly desirable, studying may not be affordable for vast majority of Kosovan students. Annual fee for studying in private institutions ranges from €1500 to €5000, while at the public University of Prishtina it goes from €100 for

80 Kosovo General Government 2003 Budget, December 2002, (www.unmikonline.org/civiladm/cfa/2003KBudget_eng.doc)

81 Kosovo General Government 2003 Budget, December 2002, (www.unmikonline.org/civiladm/cfa/2003KBudget_eng.doc)

82 SOK, Basic Demographic Data for Kosovo, http://www.sok-kosovo.org/pdf/population/Basic%20Demographic%20Data%20for%20Kosovo.pdf)

83 (EAR, Future VET needs & engagements in South Eastern Europe), (http://www.ear.eu.int/publications/news-a1f2adii3.htm)

undergraduate to €800 for graduate studies. In addition, in UP there are certain other fees such are exam fees, diploma or degree fee.

Public Universities in Kosovo were accredited in interim basis directly by UNMIK. Given the Kosovo Accreditation Agency has not been established yet, according to the UNMIK regulation no 2003/14 the University of Prishtina is considered to be licensed without time limitation under provisions existing as at 1 September 2000. The UNMIK controversy executive decision 2002/15 accredited on interim basis the University of Mitrovica as a higher educational institution in Serbian language. This university does not conform to the on-going educational reform in Kosovo neither regarding the structure of studies nor the curriculum. While the University of Prishtina reports to have currently enrolled around 25.700 undergraduate and graduate students (source: Students Service, UP Rectorate), there is little information on the exact number of students enrolled in other universities in Kosovo. It is estimated that this number does not exceed couple of hundreds. That having said, for the purpose of this document, it may be regarded that discussion with reference to the University of Prishtina encompasses all the higher educational level in Kosovo.

Apart from the regular higher educational level, the specialist education for ICT experts is available through various vendor-specific trainings. The major step in this direction was made in 2000 when Cisco Systems entered the Kosovo educational landscape with its program of Cisco Networking Academies. Soon after, the program became, and to date remains the most popular ICT specialist training program in Kosovo. It is offered through a system of two regional academies and dozens of local academies run usually by local NGOs. Courses provided by this program have been adopted as a regular offering at the University of Prishtina too. The success of this program may eventually be surpassed only by the ECDL and MOUS trainings that have become available through licensed centers in 2003 and 2004 respectively and are currently gaining in momentum. The majority of the trainees in these newly established centers come from the government institutions.

The issue of vendor-specific ICT training was discussed pressingly by majority of the participants of the last year's national ICT strategy workshop organized by MTC and funded by KFOS (December 2003). The vendor training has been regarded vital to developing of a skilled workforce that will in turn, foster and attract investments in ICT sector in Kosovo. It is hoped that a right initiative from the Government, through the Ministry of Education, Science and Technology (MEST) or perhaps through the dedicated Information Society Agency, in acknowledging the vendor certificates will create prerequisites for a stronger presence of vendor-specific ICT training programs in Kosovo.

Quality of computer equipment used by academics. Connectivity.

In general, the ICT equipment in educational system in Kosovo consists of small number of fairly newer generation PC computers (PIII and PIV). Older computers were destroyed or looted during the war. In primary and secondary schools LANs are present, if at all, in specialized classrooms (cabinets). The situation is much more favorable at the university where all faculties have their LANs, usually encompassing the whole building. The remote faculties located in regions other than the capital Prishtina have considerably less developed infrastructure and reduced opportunities for nternet connectivity.

While at least at the higher educational level, the basic ICT equipment including LANs is there, the connectivity remains the biggest problem for all levels of educational system in Kosovo. Although the lack of infrastructure is evident factor, the lack of ideas and initiatives from MEST is currently the dominant barrier in this regard. For example, the MEST doesn't provide budget for Internet connectivity for public schools and universities in Kosovo. There were a couple of donors (KFOS and KEC) who funded projects that provided connectivity to public libraries and secondary schools in Kosovo. When the donor funding came to its end, schools and libraries were cut-off. Rarely, the ISPs that were initially contracted by donors kept providing Internet to some schools as a donation. However, not all schools had been lucky; there are only few schools and libraries in Prishtina connected this way.

The schools are unable to purchase Internet connectivity services other than through a centralized procurement system imposed by the MEST. Most of the schools that have Internet connection could not afford it other than through a donation. During the field research "ICT Status Report" survey (April 2004), a couple of respondents declared that their school or administrative Municipal Education Directorate is piggybacking connectivity to the nearby institution (usually UNMIK) or donor agency. Clearly, providing connectivity continues not to be in the agenda of the MEST.

The number of computers in primary and secondary schools is not known exactly. The MEST keeps data on the schools that do not have a computer and therefore are unable to use the EMIS data entry software. As of the latest February 2004 records, there are 112 schools (pre-school, primary and secondary) that have no computers at all. The category of schools that have computers comprises of schools that have at least one or more computers which are not necessarily used for teaching. The purpose of this record keeping is to track the schools that can not provide data through the InfoGatherer software - the data entry module of EMIS. This is flexible module that can accommodate to save and transfer the data through floppies, or directly via online connection. Data gets replicated at the municipal or central level. EMIS keeps comprehensive data on the following broad categories, each of them with a number of attributes: School (ID, name, type, director, phone, fax, e-mail, contact person), School facilities (very detailed inventory; 38 attributes), Classes (6 attributes), Pupils (broad personal data, 25 attributes)), Teachers (professional and personal data, 20 attributes), Admin staff (personal data, 14 attributes) and Support staff (14 attributes). However, currently EMIS does not track the number of computers or availability of the Internet connection. The e-mail address, if present, serves for the contact purposes only and does not reflect the availability of computers or Internet connection in the school. The latest listing from EMIS shows e-mails addresses for 47 schools (7.4%) out of 635 schools in the list.

The consequences of non-budgeting for connectivity by the MEST are far more perceptive and painful at the university educational level, where there is no Academic and Research Network in place yet. The University of Prishtina is being connected to the Internet only thanks to a donation from the local ISP IPKOnet. IPKOnet reports to provide Internet connectivity to 14 schools of the University of Prishtina. The bandwidth to each point is 64kbps. The complete traffic goes through the wireless WAN built and owned by the ISP which in addition performs all the bandwidth management. There is little space for provision of ICT services to the academic community other than e-mail and web access, which is generally regarded as slow.

Computer and Internet skills of scientists and teachers

The EMIS data tracks a unique "Qualified" attribute for teachers, which presents an effort to obtain the data on the ratio of trained or qualified teachers to those who lack appropriate training. The school census conducted by MEST is based primarily on documents and certificates of the teachers, which may not necessarily reflect the level of expertise in view of current curriculum and methodology advancements. A partial EMIS break- down by 30 municipalities and

subjects /courses (Cycle 1/ 03-04) shows that in total there are 11033 (74.6%) qualified and 3759 (25.4%) unqualified teachers. The qualified-unqualified ratio seems to have improved since 2000 when the Department of Education and Science (DES) estimated it to be 3:2. ("Thematic Review of National Policies for Education - Kosovo", Directorate for Education, Employment, Labour and Social Affairs: Education Committee, Stability Pact for SEE, June 2001). There is no entry for Informatics, Computer programming or ICT related courses in the current break- down by subjects /courses.

In primary and secondary education the orchestrated training of teachers in new teaching methodologies that encompass e-learning and use Internet as a basis for teaching can be regarded as inexistent. The "ICT Status Report" survey (April 2004) shows that teachers have been left on their own when it came to training for Internet and e-mail use. It thus raises questions as of how is this workforce equipped with skills to teach the pupils new curricula, which again, in spite of the ongoing reform, is felt to be outdated. Among the respondents, 56.3% consider that primary and secondary education deliver little literacy skills that will serve as basis for development of ICT (C1Q17). The issue certainly requires further and focused assessment with a larger sample of school- teachers.

The University of Prishtina (UP) is in a considerably better position regarding the ICT skills of its instructors. During the past years UP has continuously been in the focus of donor agencies and MEST. Instructors as well as students could benefit from various on- site training programs, students and instructors exchange programs aimed at developing and updating skills. An excellent example in this regard is the University of Prishtina Summer University. This event is being organized jointly by Academic Training Association (ATA) (www.academictraining.org) and University of Prishtina (www.uni-pr.edu) for the fourth consecutive year with a good chance of becoming regular event. The students and professors from universities abroad can apply online for taking and teaching courses respectively. The event brings together each year up to 800 students and professors from universities all around the world. It servers as a hub for experience exchange and is largely considered to be among the most useful happenings at the UP. However, it is of a closed nature for participants other than those coming from universities.

Brain drain

Educational system in Kosovo has suffered and continues to do so from the high brain drain. The brain drain process in Kosovo can be more regarded as internal displacement rather than emigration to foreign countries. The incomprehensible situation where the average salaries of the teaching personnel are below that of the civil servants in public administration combined with the shortage of a workforce skilled in ICT, particularly among the numerous international organizations and agencies, has driven large number of ICT experts out of the educational system. The ICT specialist educational system has been surviving only thanks to the part time engagement of some of the instructors, which can afford to teach classes usually only on after-hours, and on Saturdays and Sundays, after they have completed a full time working hours schedule in a higher motivating workplaces.

MIS for educational institutions

Development of the Educational MIS system for the MEST was supported by the World Bank through Education Participation Improvement Project (EPIP). The EMIS project does not include data on the universities. The first phase has been completed and the software has been deployed throughout the schools in Kosovo. EMIS enables creation of the inventory of all schools facilities and tracks the pupils' progress from the pre-school institutions through the primary and secondary education up to the university level. Through the planned improvement of the education management information system (EMIS) will be strengthened to specifically, help monitor school enrolment, attendance, retention or dropout, and completion, including accountability for children in targeted municipalities, not participating in the school system[84].

The MIS for the University of Prishtina is being developed as a part of a Tempus project of the University of Prishtina Central Administration. The MIS project (codename "Sekretaria" and "Studenti") now at its third year of piloting is showing significant design flaws that prevent it from fitting and integrating into the University Administration. After three years of prototyping the projects has wiped out the planned funding and is facing a dead end.

The UP Central Administration has come up with an idea to establish the University Computing Centre (UCC) that is supposed to serve as a hub for all ICT developments in UP including MIS. However, UCC is taking ground very slowly, if at all, due to the lack of funding but also due to the inert bureaucracy.

Libraries

The National University Library of Kosovo (NULK) has started a project named "Integrated Library System for the National and University Library of Kosova" that will provide the standard electronic library catalogue services. The project is planned for completion in December 2004.

On April 2004, UNDP, NULK, and Kosovo Assembly representatives signed a Memorandum of Understanding to establish an Information Center within the NULK for access to the Parliamentary Electronic Archive of Kosovo. The center containing 15 computers will be made available to members of the public in Kosovo interested in the Kosovo Assembly documents, thus promoting transparency of the Kosovo government.

However, for the time being, the National Library does not offer comprehensive access to on-line libraries and digital journals. The access to on-line libraries has and continues to be sporadic and subject to fragmented direct donor funding to the faculties of the University of Prishtina. NULK offers no on-line services to the university students.

E-Learning

E-learning initiatives in Kosovo include several projects the largest being Cisco Networking Academies and the Telemedicine Center of Kosova. In addition, there are numerous e-learning centers to provide specialist training to targeted groups of users. Here we can name "The study abroad" project of the British Council, IPKO Management Institute, KIPRED's Internet Academy for Democracy (IAD) and several graduate studies offerings provided by foreign universities or through partnerships with local university.

E-learning is still considered complimentary to traditional education, while it is much more frequently option of choice for post-education and life-long learning. The e-Learning user groups fall mostly at the older age-groups. In addition to employees and unemployed, the user groups are also comprised by students seeking for a "last minute" upgrade of their skills as a competitive employment advantage. Possession of certifications from recognized e-Learning centers is frequent requirement on the applications for employment. E-Learning is not very much present at a primary and secondary level education.

[84] The World Bank, Education Participation Improvement Project-EPIP, Apr 2003, www-wds. worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000094946_03042604002460.

3.8.7. SCG - MONTENEGRO

System of education in Montenegro, from elementary to university level, doesn't give satisfied opportunity to pupils to adopt the knowledge using computers and Internet.

In the current structure of education system in Montenegro, there are no enough ICT contents, what is the problem for pupils to get the computing literacy and to include themselves into information society. It's the situation for the teachers too, because at the universities attended by future teachers there are no subjects of ICT learning.

Curriculum is insufficient based on ICT and there is no chance to use the all opportunities ICT offers. There is no ICT and EU standards, what is the problem should be resolved within the reformation of the system of education.

There is "Strategy of education system" prepared by Ministry of education, that made research on all level of education.

Ministry of education is in the phase of new research, but these data haven't yet statistical prepared, but in accordance with the acquaintance with the competent person from Ministry, there are a fresh data.

There are 207 elementary and secondary schools, with 1270 computers. The ratio of computers to pupils is 1:82.

ICT Status in All Elementary Schools

- There are 161 schools, with 780 computers used in tuition.
- Teachers ICT educated - 10.8 %;
- Pupils ICT educated 14.07%.
- The ratio of computers to pupils is 1:94.
- More than 40 schools have computer classroom, with more than 250 PCs.
- Schools have direct (fixed) lines, occasionally used for Internet connection by modem.
- More than 12% of schools have Internet connection

ICT in All Secondary Schools (Gymnasiums)

- There are 46 schools, with 490 computers used in direct education.
- Teachers ICT educated - 18.9 %
- Pupils ICT educated 29.2 %.
- The ratio of computers to pupils is 1:64.
- Thirty-four schools have a computer classroom.
- More than 40% of schools have an Internet connection.
- Schools have direct (fixed) lines, occasionally used for Internet connection by modem.
- More than 11% of schools have web site.
- Only one school connects Internet by ISDN.
- Within the typical curriculum, there is ICT as a subject 90 minutes per week in the first year --- with 72 lessons per year.

ICT Status in Eight Selected (Excellent) Secondary Schools (Gymnasiums)

- Teacher ICT educated - 20 %,
- Pupils ICT educated 40.5 %.
- The ratio of computers to pupils is 1:58.
- Every gymnasium has a computer classroom.
- 50% have an Internet connection,
- Two gymnasiums have web site.

Ninety percent of the use of computers is in seventh and eighth grades of elementary school and the first year of secondary school. There are some examples where computers are used within the English lessons and/or for the organizing of computer courses. There are more 270 computers in elementary and secondary schools, which are used in school administration.

The document MEIS (Montenegrin Education Information System) has just been finished. The document contains material for the next three years and addresses integration and application concerns as well as the needed resources (hardware, software, LAN, staff and staff training, financial fund etc). The acceptance of this document would satisfy many of the ICT concerns with respect to education.

Some details for 2004

- LAN is finished in 30 schools (20 elementary and 10 secondary schools);
- It has been started the integral application of education (Internet oriented and Oracle)
- The plan to the end of year is to equip these 30 schools with modern computer equipment amount of 1,000,000 €. It will be installed 900 PCs. The plan is to do LAN project for more 50 schools.

ICT at the University

In accordance with the development of ICT it's higher the need for ICT experts. There is initiative about the constant specialization of ICT staff and the modification of curriculum at the universities.

On the Faculty of Mathematics and Faculty of Electronics, there are desks of ICT. The desk on Faculty of Mathematics cover the lectures of data- base and application software and on Faculty of Electronics the students get a knowledge of network and hardware.

Information system of University of Montenegro is defined as system unique realized for all parts of University. Its organization is in accordance with the modern concept of information system that should provide unique development and maintenance of system.

Unit of University of Montenegro in charge of information system is Center of information system, formed in June 1996. Center provide free of cost and permanent hosting for www presentations for their registered users, for their units and organizational parts and for University organizations and associations.

University library is central library of University of Montenegro and home library for other libraries within the university units. Library is in function of teaching and science researching process of University. It grows in an modern information center, personally and technically prepared for wide reading public.

Academic network

Information System of University of Montenegro uses the direct fibre optic between five cities and university units within some of them:

- Podgorica (Faculty of Medicine, Faculty of Economy, Faculty of Law, Biotechnical Institute, Institute of History, dormitories and Montenegrin Academy of Sciences and Art);
- Kotor (Institute for the Biology of sea, Dormitory, Faculty of Tourism, Library and State Archive of Montenegro);
- Nikšic (Faculty of Philosophy);

- Igalo (College of Physiotherapy);
- Cetinje (National Library, Academy of Art, Dormitory).

In the phase of preparation are connections with Bar (Subtropics cultures Office) and Bijelo Polje (Center of Fruit growing).

Over the all units, fibre optic network is done on the closing optic cases. Conception of complete network is based on division of university units in four cities academic networks.

- Podgorica (with units in Bar and Bijelo Polje):
- Nikšic,
- Cetinje and
- Kotor (with unit in Igalo)

Center of Information System, with the units located in Podgorica makes connection using proper communication equipment (base-band or SDSL modems) within leased line, transmission speed kbpsM-bps160 kbps to 1 Mbps.

Nikšic, Cetinje and Kotor make connection using proper communication equipment (voice band modem) within leased line. Transmission speed of 28.8 kbps doesn't satisfy the needs of development, but more work is needed for improvement.

The movements toward the introduction of ICT in all spheres of life and different requires of modern technologies cause that education system become a part of such environment. Introduction of ICT in education system of Montenegro requires financial resources for infrastructure and for development of personnel.

Introduction of ICT in education is an important part of Strategy of information society of Government of Montenegro. Unique information system of system of education, to the university level, should be a spin of any modern education system.

3.8.8. SCG - SERBIA

Education is the key to an inclusive Information Society. Education assists the confidence in ICT. As the level of education increases so will the rate of ICT use. The incorporation of ICT in education system provides the most definite solution to the digital divide.

3.8.8.1. PRIMARY AND SECONDARY SCHOOLS

Serbia and Montenegro have 4000 primary and 500 secondary schools. Belgrade has 16 municipalities with 163 primary and 73 high schools.

In primary and high schools, there are either no computers, or less than five. Access to computers is limited to some teachers/administrators. Computers tend to be older generation models, such as stand alone 486 PCs or the equivalent. Where there are multiple computers installed, they are not networked. Use of the computers is limited to electronic documents that are available on hard drive or diskettes. There may be connectivity that is used usually for email communication only.

The percentage of students and teachers using computers is 20% in secondary schools and less than 5% in primary schools (UN, ECE, pg. 19). Only a small number of teachers use computers in a very limited fashion. Most of those are theoretical applications using non-graphic operating system (such as DOS and UNIX), and theoretical education using programming languages (such as Basic, Pascal, Fortran and Cobol).

The level of computer literacy is high in urban secondary schools. In other secondary schools and in primary schools is low. We can say that teachers do not have appropriate access to information available on-line. Students do not use Internet or advanced software, and teachers are not trained appropriately to incorporate computers into the teaching methodologies.

Example:

- Large municipality of Palilula in Belgrade has 17 schools, and 4 of them have a number of old generation 286 and 386 computers.
- The best equipped is the Secondary Philological School, also known as The Second Belgrade Gymnasium having 15 computers, 3 x Pentium III, 3 x laser printers (equipment procured by a Cyprus humanitarian organization), 7 x Pentium II and 5 x Pentium I (including the older generation: 2x286, 3x386). Computers are stand-alone and not networked.
- Two secondary schools are connected to Academic network-The Railway technical schools and Mathematical School.

Network learning programs (e-learning, distance learning) are not developed at all at this level of education.

Elementary schools in Serbia and Montenegro work according to informatics educational program, which is mainly based on using applications in Windows. Secondary schools, depending on the school profile, offer the knowledge related to information technologies and their application, as well as the use of certain program language (mostly Pascal).

According to the data of 14 December 2001, the web sites in Yugoslavia have 67 faculties, 54 schools (elementary, secondary, colleges) and 19 libraries.

The reform of the entire educational system is in progress, with many donor projects already completed and the first results are evident already in primary and secondary level education. As a result of these projects, there is a considerable improvement in educational facilities, particularly in terms of school equipment and general working conditions. Furthermore, many schools are now using ICT as an educational tool, including schools in marginalized and socially impoverished areas

Although ICT courses are not an integral part of the curriculum of primary schools, the number of schools having IT facilities (PCs, computer labs etc.) is increasing. Methods of securing such facilities vary from sponsorships, parents' initiatives, and donor support to other arrangements. For example, IT equipment in some schools belongs to private companies which rent space/areas and organize IT courses after classes at school.

Since September 2003, the youngest pupils are attending the "New School". The required curriculum introduces a number of significant changes to the primary education in Serbia. Together with their parents, first grade pupils can even select two optional courses. One of them is called "Computer Playroom".

Software for enrolment to secondary schools has been developed and implemented, thus making huge improvements over the previous system. Database of secondary school students has been established by the IT Department at the Ministry of Education. This effective and efficient tool has brought confidence to all participants (students,

parents, teachers, administrative officers), and improved transparency of the admission process.

The "Education Management Information System" project, funded by the World Bank is in the final phase. The development objective of the "Republic of Serbia Education Improvement Project" is to build capacity and produce system information to help government promote effective education reform. An integral part of this project is the establishment of the Education Information System (EIS) in Serbia. The purpose of EIS is to promote the effective management of resources and monitor performance in the country's educational system. EIS will facilitate an IT system, related user training programs and have a capacity for formula-based funding analysis and expenditure monitoring at the central level.

ITIA has proposed a number of projects for Secondary Schools, to stimulate improvement in ICT education.

- The project titled "European Computer Driving License (ECDL)" aims at the establishment of a standard, internationally recognizable measure of basic computer skills for all graduating high school students in Serbia.
- Another project/program has been created as a partnership between government institutions, local IT industry and international organizations. Hopefully "Internet for Every High School Student" will provide access to the Internet for all high schools in the country.
- The Ministry of Education has approved the "Wireless Internet for Secondary Schools" project, proposed by ITIA. Support has also been obtained by a number of international donors (i.e. Norwegian Government) and local companies. The implementation of this project depends on the mobilization of additional funding.

3.8.8.2. UNIVERSITY LEVEL

The University of Belgrade consists of 30 faculties with the number of undergraduate students ranging from 65,000 to 70,000 and with 20,000 postgraduate students.

All Universities in the country and two mentioned high schools are connected to the Academic Network. The Belgrade Academic Network is the heart of this network and is owned by the Belgrade University.

The Belgrade Academic Network is the heart of Yugoslav Academic Network. The entire university network is connected through the Belgrade University Computing Center with 2 MBPS and they are connected to the Internet via local commercial providers at a speed of only 512 K. The connections with Internet are: 34 Mbps through GrNet and additional commercial Internet connection of approximately 34 Mbps. The connections are overloaded especially the ones establishing connection to Internet. The access to the network is free for lecturer staff, researchers and students. There is a 100 MB optical backbone in the city, between the two central nodes of the Belgrade Academic Network, and there are 63 Academic institutions connected to this network. Telecom Serbia allocated 60 landlines to University for accessing the Network through the dial-up. More information on the Academic Network can be found at http://servlet.rcub.bg.ac.yu/.

- 2nd node is in Nis: all university facilities are connected through 2 Mb digital connections (sponsored by the Federal Secretariat for Development).
- 3rd node is Novi Sad: all university facilities are connected through 2 Mb digital connections (sponsored by the former Ministry of Science)
- 4th Kragujevac, Pristina" poorly equipped.

The access to the network is free for lecturer staff, researchers and students. 100.000 users are connected to Academic Network and there are more than 10.000 e-mail accounts.

The most interesting achievement in Serbia, i.e. the dark fibre backbone, is based on two-three years of negotiations between AMREJ, the Serbian NREN, Telekom Serbia and the government, who is the main stakeholder in the company. At the end the government succeeded in convincing the national carrier to provide fibre to the NREN. For Telekom Serbia and the NREN this presented a clear benefit, as the Government has supported the operation financially and as optical fibre was already in the ground Telekom Serbia did not have to bear any additional cost.

The following table gives the structure of financial resources in Research & Development:

Current typical core usable backbone capacity in Mbps	155.00
Expected increase in two years' time	Expect to increase from 2 Mbps to 1 Gbps
Total amount of traffic in Terabytes in 2002	
T1 (traffic from customer sites)	17.50
T2 (traffic to customer sites)	26.30
T3 (outbound external traffic)	4.30
T4 (inbound external traffic)	13.20
Approximate percentage of T3 and T4 traffic to/from the Commodity Internet	80
Volume of traffic in January 2003 in Terabytes	
T1 (traffic from customer sites)	1.40
T2 (traffic to customer sites)	2.20
T3 (outbound external traffic)	0.35
T4 (inbound external traffic)	1.10
Backbone capacity in Mbps x km	140110.00
URL to the map:	http://amrej.rcub.bg.ac.yu

Technology used on the core network	
Technology	Percentage (or mark X)
ATM	
ATM over SDH	
SDH	X
Ethernet	X
Gigabit Ethernet	X
DWDM	
Packet over SONET	X
Other, fill out below	
Planned changes	Upgrade SDH and Packet over SONET to Gigabit Ethernet over dark fibre or DWDM.
Involvement in Internet Exchange Point	No official IEX exists in Yugoslavia, but we are interconnected with the following local ISP: BeotelNet, EUnet Yugoslavia, SezamPro, PTT.
URL for the relevant Internet Exchange Point(s):	
Remarks	Backbone links are mostly 2 Mbps, with one link of 155 Mbps and one of 1 Gbps.

(For more details see http://www.terena.nl/conferences/nato-anw2003-/proceedings/jovanovic.pdf).

The only obstacle is to secure the funding for the optical cabling to be put in place from the Hungarian border through the cities of Subotica, Novi Sad, Belgrade and Nis (from the most northern to the most southern point in Serbia). The future phases of the project plan to connect such network with the academic networks in Rumania, Bulgaria and Macedonia (and through Macedonia eventually Greek Academic Network as the member of EU), thus in a long run expanding the EU Academic Network across the Balkans and Greece (as the only geographically isolated member of the EU).

Concerning further development of Belgrade Academic network very important part is project SINYU. The project Scientific Information Network Yugoslavia - SinYu has been done in cooperation and support of Max Planck Institute, Germany. The main purpose of this project is the establishment of information network - connections of great speed (2.5 Gbps), which would connect all universities and scientific institutions in Serbia and Montenegro. This would enable Yugoslavia to become the member of European Academic Net, so SinYu project represents the integral part of GEANT European project of European new generation net establishment. In the same time, SinYu is in accordance with EU CARDS project goals, which intends to improve education development, social and professional development and establishment of regional and interregional cooperation in Europe.

Concerning the percentage of students and teachers using computers it is 90% of university students and teachers use computers.

Differences between the computers available are huge -- ranging from 500 computers available at the Faculty of Electrical Engineering, to other Faculties who on an average have less then 20 computers. Most of the computers tend to be older generation.

Almost all state universities possess certain web presentations, but unfortunately they are on the low level, being very static and rarely up-dated on one hand and on the other they do not enable interactions with their visitors. There are some positive examples among which the sites of the Faculty of Organizational Sciences and the Faculty of Technical Engineering are most distinguished. These sites, according to built-in functions, do not lag after the majority of developed countries' sites and enable student's variety of facilities such as exam applications, time schedule, exam results etc.

Web sites, which offer students a number of information, are also interesting. These sites refer to activities on the universities and some faculties, and information on entrance exams is especially effective. The best-known site in Yugoslavia could be found on www.infostud.com.

Academic net is often used for consultations with students and their teamwork, especially with students of information science profiles. The idea about development of virtual university, which would enable active joining the course of studies process of great number of experts from different fields, coming from Yugoslavia, and work on developed countries' universities, is also interesting.

Initiatives in e-education are sporadic and they are not the results of our education system. They are lead by some experienced professors or other persons from the university stuff, as private initiatives, or as private investments. It leads to the conclusion that our educational system is inherent and new ideas are coming only when real material stimulations could be found. Transition processes and personal initiatives in this sector are bringing Internet technologies to the light of the day, but these technologies are also strongly influencing new ideas and projects in education.

University education in ICT grows steadily and students are trained to use enhanced information and communication technology to improve their learning experiences. The University has been producing highly trained professionals in this area. During the last 10 years, approximately 250.000 graduated students emigrated to developed countries, which means that educational improvements and wider use of the computer networks would enable professionals to work worldwide. Major development opportunities can be found in the software development domain.

Transition process in higher education is also underway. Reforming the University Curricula, corresponding to the Bologna Process, is taking place.

This autumn state universities obtained competition - a private Faculty of Computer Science has admitted its first generation of freshmen.

A number of Distance Learning initiatives have been launched. Institutions supporting such training methods involve state (Technical Faculty in Zrenjanin), private (Megatrend University) and other (Belgrade Open School) institutions.

As the result of the active involvement of the Serbian High Education system in the Tempus project, a Tempus office has been opened in Belgrade. Ongoing is the project Implementing Quality Assurance to Serbian Universities. The main objectives of this project include facilitation of the recognition of Serbian Universities to the European Higher Education Environment, solving major reform challenges in the Higher Education, and the analysis, design, implementation, and monitoring of Quality Assurance Systems and procedures.

Best practice example:

- The first virtual university bookshop in Serbia can be found at the address: fortuna.junis.ac.yu:81/Unbol.htm. It sells about 8.000 items in English and 2.000 items in Serbian and its main goal is to bring most interesting books to the students at the University of Niš. It was open at the beginning of this year, so it is hard to speak about any kind of experiences.
- There is also an interesting experience connected with a popular professor from the University in Belgrade. He returned from Perdue University and he organized a group of best students. They made excellent courses in data mining, semantic Web, peer-to-peer, m-commerce and many other Internet technologies. It is possible to find that list and demos at the address: galeb.etf.bg.ac.yu//~v-m/tutorial/tutorial.html. This group of active students and engineers has fulfilled worldwide all terms for their courses till May 2004

3.8.8.3. DISTANCE LEARNING

Although the number of Internet users in Serbia and Montenegro has increased within the pas several years, we have to notice that there is a major lack of domestic web sites, especially with content in Serbian. The most of the web sites are either having commercial, informative or entertainment character. Educational web sites are very poorly represented, even in the case of educational institutions posting them. The large number of the academic population still does not have the habit of utilizing Internet in education; the Internet is mostly used as a communication tool, entertainment or for acquiring news.

Insufficient education of the academic and the general population on the benefits of Internet is widening the digital divide, including the language barrier and insufficient amount of the local content.

The use of ICT in university education is gradually increasing. Besides the science, engineering and IT courses, other courses are supported as well with information gathered from the Internet.

Due to the poor connectivity within the country and the slow connections, the world concept of distance learning based on large amount of educational materials, including the multimedia presentations is still not possible to implement. In addition, the introduction of distance learning programs is not stimulated by the authorities; however some research on the subject is performed by Ph.D. students at the University of Belgrade, especially at the Faculty of Organizational Sciences.

In Serbia, the first and only Distance learning Center was established through the British Council. The British Council DLC consists of three components:

- Video-conferencing studio with 30 computers with Internet access for educational and training purposes;
- Cyber cafe offering ten Internet enabled computers for use by the public;
- Library containing 7,000 books, 80 journals and newspapers, and more than 1,000 audio and videocassettes.

In 2001/2002 there were 50 students trained at the British Council KLC in Belgrade. An additional 20 are expected in 2002/2003.

3.8.8.4. DEVELOPING THE ICT WORKFORCE

Serbian Chamber of Commerce has developed the basic computer literacy national standard, which is based on the ECDL. This European standard specifies requirements for completion of the accreditation from CEPIS, and the establishment of the National Association for Information Society. This is a prerequisite for Serbia's participation in corresponding European organizations/programs.

The Center for Adult Education organizes ICT courses for unemployed, disabled or other citizens. The program is designed according to the ECDL and EXPERT standards, which are approved by the European Union. There is no comprehensive coordination of these activities.

In 2002, Belgrade Open School completed a survey on the Internet usage in Belgrade, based on preferences, online behavior, and political orientation of participants. At the end of 2003, it also finished the Internet Survey - Serbia 2003. Statistical data have been collected and analyzed regarding the age, social relations, and attitude of Internet users in Serbia. The results of this survey are very interesting, and even encouraging: the number of Internet users, younger than 35, has doubled in the last two years.

University has the first-class opportunities for developing the ICT workforce, but in the primary and secondary schools opportunities for training in ICT skills are very limited. Classes and programs in ICT related subjects are available from broad range of private computer schools. However, these are usually beginner courses" covering the utilization of Windows, MS Office and / or the basic web design. Online training is not available in Serbia and Montenegro.

Some employers are investing in ICT education of their employees. Such education is being acquired through private schools, including some of the universities (such as the Faculty of Organizational Sciences). It is important to mention that such investments in human resources are provided only by large companies or government institutions.

The only examples of development of the ICT workforce are private businesses and ITIDA "Information Technology and Internet Development Agency of Government of Serbia". The number of technical personnel is increasing. Formally, most of them are not full time employees, but are paid per project or receive monthly fees for their services (without social and pension insurance). Part time software developers and web designers usually work from their homes. They are usually young /students, although they sometimes have another profession/job. The number of companies hiring full time network administrators is increasing.

3.8.8.5. QUESTIONNAIRE RESEARCH RESULTS FROM EDUCATION SECTOR

Sample: 21 educational organizations from primary, secondary schools and universities

Concerning research results form education sector state is also not active in undertaking activities to bridge existed digital divide.

In 57,19% of valid answers educational organization do not know about initiatives of state to bring connectivity to rural areas, or to ensure support for ICT use in low-income communities (61,5%). All that answered (100%) to this question consider such activities as expensive either for state or for end-users.

According to education sector population is not fully aware of the opportunities that ICT has to offer and educational organizations are not familiar that state undertakes programs to increase that awareness (66,7%).

Although current state of e-government is characterized by no existence of effective system of decentralized decision making that will engage participation of low income and traditionally disenfranchised groups, (92,9%) and by low level of understanding of the role that the State needs to play in order for ICT to help combat poverty (71,4%), educational organization consider that public institutions use ICTs to make job information available online improving in that way the performance of labor markets in 86,7% of all valid answers.

Concerning the introductory questions about school system and training programs answers were the following:

- Formal school system, teachers in particular, are fully equipped to help students benefit from computerized and network learning (76,3% of valid answers were positive and 23,5 were negative);
- Over 50% consider that primary and secondary education deliver in a fair amount the strong literacy skills that serve as bases for development of ICT while 33,3 % consider that they deliver it in a little degree;
- On the other hand majority consider (58,8%) that technical training programs to prepare work force for ICT are developed in a little degree to enable workers to upgrade their skills and that there are no ICT training programs for low income-adults (66,7%).

Considering the availability of computers, Internet connections and WEB sites in schools and at universities the situation is the following:

- In 50% of reported 21 cases organizations have 32 or less computers, and in the same 50% of reported 21 cases organizations have 14 or less computers connected to Internet. Two hundred or less computers have 85% organizations and they have 150 or less computers connected to Internet.
- In about 50% of reported 21 cases 30 or less employees use computers and 20 or less employees use e-mail/Internet.

Schools and universities listed very similar barriers when explaining the problems in using computers for all employees and in using e-mail or Internet. Most often mentioned barriers are the following for all three cases: insufficiency of PC, education and inexperience, inadequate skills. Courses and self-education are two the most often ways that employees are trained for computer use, use of e-mail, or Internet.

Computers are mainly use for administration purposes, for education of students and pupils, for teaching, for presentation of work of students and teachers, research work, bookkeeping, school business. E-mail main purpose is communication with business partners, other schools, world, for sending school news-papers, for internal communication. Internet serves for collecting information for education and research work. Purpose of WEB is for education and promotion of faculties or schools. Ministry of science is most commonly used web address by schools and universities.

Majority of schools and universities have WEB sites and the reasons for it are to introduce schools and faculties, contact with world, education, transparency. Those who have not WEB yet comment it by insufficiency of money or that preparations are in progress.

With respect to primary schools (which last 8 years), 50% have two years of IT-related instruction, and 83.3% include software packages in the curriculum. Corel, MS Word, MS Excel MS Visual Basic, and Pascal are included most often. If in elementary school exist facultative IT classes (19%), they are taught by IT teachers. 75% of teacher think that curriculum in primary schools are outdated as well as is outdated available hardware. Available platforms are Pentium with Microsoft office.

In secondary schools which last 4 years, 71,4%% have all 4 years IT related subject and software packages are in 87.5% included in curriculum. Corel, word, excel access are more often. If in secondary school exist facultative IT classes (28,6%), they are taught by IT teachers and associate experts.

In 50% of reported 21 cases only 5 or less teachers use computers in the process of education of their students. Majority of secondary school teachers think that curriculum in secondary schools are not outdated (66,7%) although 57% think that available hardware and software platforms are outdated.. Available platforms are Pentium I with Microsoft office.

In 66,7% of reported 21 cases 120 IT expert specialized for hardware and 120 IT expert specialized for software finish the Universities each year. Half of the respondents consider that there is healthy practice of hiring young professionals in public sector, have think that there is not such a practice. In 90,5% of reported 21 cases estimations are that 10% or less of IT expert leave the country in the first year after graduation.

3.9. E-HEALTH

3.9.1. ALBANIA

Official number of hospitals all over the country was 50 in 2001 (6 in Tirana) and a total of 10,065 beds (2625 in Tirana). There were also 596 health centers and 1427 ambulances. Number of medical visits is 5,525 thousand, and number of hospitalized persons is 269,927 with average length of stay 7 days. There are several private polyclinics = 123; pharmacies = 888; especially number of private dental clinics is great = 695.

The budget of public health system was 7.2% of the state budget in 2001, and 2.3% of GDP [INSTAT].

Health information system in Albania is outdated and paper based. ICT is deployed in fragmented and duplicative way. Only few computers are installed and there is little networking. It is difficult to extract and process public health data - the system does not support effectively the decision making neither facilitate use of data to prevent diseases or to inform the population.

There is lack of well-defined data sets and dictionaries, lack of unique personal identifiers. Data collection and reporting has much duplications, collected data has low quality and is too centralized, which makes data non-available for end-users. Public health care system suffers from many shortages and deficiencies in ICT may look as negligible.

Ministry of Public Health has some plans to establish a new comprehensible information system that would improve individual and public health situation; pilot implementations are financially supported by USAID. It is about establishing an information system to include all data processed by the Ministry.

Other ongoing initiatives are focused on primary care services and there are some automated information systems, which are driven more by pragmatic purposes instead of real health system needs. A particular case is the project for the pharmaceutical sector for controlling and managing of drugs flow in Albania.

There is Institute of Public Health doing research in public health domain and affiliated with Ministry of Public Health. This institute runs the "Alert" information system for infectious diseases, used to collect data through the country and store statistics in Ministry. These data are not used for decision-making purposes. Statistical data about public heath are collected also by Institute of Statistics (INSTAT). INSTAT has units of statistics in different ministries including that of Public Health.

The system of medical insurance is undeveloped, and historically hospitality expenses were covered by state budget. Different social insurance companies do temporary medical insurance for people who travel abroad. In beginning of 2004 Government decided to apply obligatory medical insurance system.

Several private clinics and hospitals are using specific IT medical equipment for their needs (ultrasound, express laboratory for quick examination of blood and urine, etc.) as well as for accounting and managerial purposes. Also they have Internet connectivity for e-mail correspondence with their colleagues abroad.

3.9.2. BOSNIA AND HERZEGOVINA

3.9.2.1. HEALTH CARE SYSTEM IN BIH[85]

Health care finance, management, organization and provision in Bosnia and Herzegovina are the responsibility of each entity, while Brcko District runs a health care system over which neither entity has authority. Bosnia and Herzegovina, therefore, has 13 ministries of health and health systems for its 3.6-3.9 million population: one for Republika Srpska, one for Brcko District, one for the Federation level and ten cantonal ministries in the Federation of Bosnia and Herzegovina (one for each canton). In brief, the different organizational structures of each entity plus Brèko District are as follows:

- In Republika Srpska, authority over the health system is centralized, with planning, regulation and management functions held by the Ministry of Health and Social Welfare in Banja Luka.
- In the Federation of Bosnia and Herzegovina, health system administration is decentralized, with each of the ten cantonal administrations having responsibility for the provision of primary and secondary health care through its own ministry. The central Ministry of Health of the Federation of Bosnia and Herzegovina, located in Sarajevo, coordinates cantonal health administrations at the Federation level. This feature will have obvious functional repercussions in terms of transaction costs, coordination of decision-making at the entity level, and other matters not faced by Republika Srpska.
- The district of Brcko provides primary and secondary care to its citizens. Because of the small size of its population, the Agreement on Brcko[86] states:
  - ü that each entity is obliged to pay health care contributions for pensioners, war veterans, invalids, displaced persons, and others not otherwise insured in the Brcko District (for example, members of each entity who receive medical treatment in Brcko); and
  - ü that entities will also contribute according to each entity's practice for those unemployed until unemployment bureaus are taken over by the Brcko District itself.

It is essential to understand that there is no national mandate for health care financing and provision. However, beyond that entity-related split, it is worth mentioning that the basic outline of the health care delivery system in Bosnia and Herzegovina has not changed significantly from the way it was before the war.

The similarity between postwar and prewar health systems occurs in spite of a process of reform, decentralization and recentralization that began as a part of the Dayton Agreement. Despite a number of reform proposals, a plethora of working groups, laws, and drafts of laws, health care delivery remains essentially unchanged as compared with the system that the country inherited when it became independent.

The concept of decentralization and recentralization is fundamental to understanding the health system of Bosnia and Herzegovina. Before the breakup of the former Yugoslavia, the health

[85] Major sources: Federal ministry of Health FBiH; Ministry of Health RS; "Health Care Systems in Transition: Bosnia and Herzegovina", European Observatory on Health Care Systems, 2002; "Millenium Development Goals and the Information Society, UNDP BiH, 2003.

[86] Agreement on the implementation of the entity obligations from the final arbitral award for Brcko on health care and health insurance. Sarajevo, OHR, 1999.

system was "centralized" at the level of the Republic of Bosnia and Herzegovina. As a result of the war and the subsequent Dayton Agreement, Bosnia and Herzegovina was divided into two entities, each responsible for administering its own health system. Whereas Republika Srpska opted for a centralized health system, with one ministry of health overseeing the health system, the Federation of Bosnia and Herzegovina opted for a decentralized cantonal system, with each canton responsible for its health care administration and financing. As the Federation of Bosnia and Herzegovina opted for the decentralized cantonal model of health system administration, the "federal" level was given a limited and non-coercive role that ensures compliance with entity-legislated policies.

In fact, Bosnia Herzegovina is a case study of premature decentralization. The prewar health institutions, unready for change, remain functioning as in the prewar environment while newly created facilities lack the capacity to operate efficiently. From a health system point of view, the division of Bosnia has created a number of problems. First, inter-entity coordination in matters of the health system have been poor because of the lack of formal legislated mechanisms. Second, within the Federation of Bosnia and Herzegovina, the cantons do not officially collaborate with each other.

There are some exceptions to this, as recent legislation has called for minimal cost sharing across the Federation of Bosnia and Herzegovina cantons to be redistributed by the federal health insurance fund for tertiary care. With the establishment of Federal Solidarity Fund in January 2002 (that actually became fully operational in 2003), there is a strong hope that equity issues will be addressed more broadly and that over time inter-cantonal cooperation will be increased. Prior to that legislative initiative, the only cross-cantonal cooperation occurring was between Croat cantons, through merging health insurance funds to increase their risk pool. Although this probably increased allocation efficiency, it was a politically sensitive issue, not consistent with the principles of the Dayton Agreement.

3.9.2.2. INFORMATION MANAGEMENT

The healthcare-statistics information system of Bosnia and Herzegovina has been methodologically taken over from the former system16. Ever since 1966, the overall healthcare-statistics information system in the territory of former Yugoslavia was based on the constitutional powers supporting the use of uniform methodological principles and statistical standards.

The data and information in the field of healthcare are gathered by means of keeping records in accordance with the uniform statistical standards and methodological principles (uniform definitions, nomenclatures and classifications), which is a basis for a uniform system. Reporting on the health situation of the population is a legal obligation of the professional institutions at the Cantonal/regional and Entity levels (Public Health/Healthcare Institutes)

Reports are prepared in the form of healthcare-statistical publications which are, usually, vague for interpretation to the general public, or in the form of comprehensive analyses which are also, in most instances, inappropriate for the general public. The issue of health of the population is, unfortunately, only declaratively supported by the Constitution and other relevant legislation, while there is no continuing and wide debate on essential health related issues at different levels of administrative and political structures.

In Bosnia and Herzegovina, there is no clearly defined obligation to provide information to the population, nor do the citizens have relevant information on access to the health-related data. The citizens and healthcare professionals do not expect much with regard to information and the right to information concerning health and health services, health policies, health financing, health statistics, etc.

An analysis of the existing legal and statistical regulations of the current healthcare and information system, as well as an analysis of the operational functioning, show that the main overall problems are inadequate organization and management of health-related data and information. The use of health-related data is insufficient, especially in the place of their creation, so that many of them as insufficiently used for operational purposes, management purposes, and direct management and planning are becoming practically worthless. Links between health-related data and information are inadequate. There is no feedback of information, nor a synthesis of all relevant information on the health situation of the population and the degree of utilization of healthcare resources at all administrative and political levels, which results in "inadequate" follow-up of the actual health-related problems and "inadequate" resolving of these problems. The following are some of the specific problems:

- All necessary public health records are not kept at the State, Entity and Cantonal/regional levels, and there are no solutions for the minimum sets of data which should be reported at the administrative-political and institutional levels;
- The system is centralized without clearly defined rights and obligations at the local level in terms of regular reporting and regular informing of the population, which means that data are being accumulated at higher levels of the healthcare system, few data are being analyzed and only small amount or no data is returned to the lower level (Canton/region, Municipalities, health institutions). It is difficult to make comparison of the information existing in such a form between individual Cantons or health institutions;
- The lack of specific health-related data for individual administrative-political and institutional units;
- There is no clearly defined relationship and the manner of exchange and use of data between professional institutions involved in different activities which have their own databases that are directly related to the health situation of the population.

With such lack of connection and fragmentation of information systems, which is the reality at the moment in both Entities and the Brcko District, and especially at the level of Bosnia and Herzegovina as a State, it is illusory to expect success of their support to the overall reform of the healthcare system. The data collected and processed in the existing information systems within the health institutions are flawed to a large extent, and the manners of their use do not meet the contemporary requirements in the healthcare sector. This particularly relates to:

- Lack of harmonization of the legislation and bylaws with the international trends in the field of healthcare statistics and medical informatics;
- Lack of established information flows in the healthcare;
- Lack of an integral healthcare information system development plan;
- The existing healthcare information system does not collect reliable information on persons who have no access to health services or those using the private sector.

3.9.2.3. EQUIPMENT IN HEALTH CARE INSTITUTIONS

Equipping health institutions with computers has been and is still disorganized and left to individuals' wishes and knowledge. Development of the regions and resources they can provide are the decisive factor for the procurement of equipment, rather than needs, cost-effectiveness and modernity of the equipment. It should be added that most of the equipment was donated and therefore it was impossible to exercise any influence regarding the standardization of the equipment, even at the level of the same health institution.

In many medical institutions individual types of equipment are in use (CT, MRI, X-ray machines, different types of analyzers). These pieces of equipment inherently contain microprocessors or computers, so that they can autonomously process the parameters for which they are meant. However, due to the fact that they are not connected into a single computer system of the institution (although they have digital outputs for the use of data in networks) they are losing the advantages offered by the system (distribution of data within the institution, keeping data in databases, using data and information for research purposes, etc).

Particular devices are equipped with application programs and are dependent on the equipment supplier. In some health institutions and outpatient facilities there are local programs based on different types of databases, which are mainly used for monitoring of the economic parameters or health insurance data, and they are less or not at all used for medical or healthcare purposes (Healthcare Centre (HC) Sarajevo, HC Bihac, HC Srbac).

3.9.2.4. PHARMACY

The application of information and communication technologies in pharmacy has a wide application in different fields. The following four sectors are the priority for BiH health care system:

- Information on drugs
- Monitoring drug consumption
- Monitoring side-effects of drugs
- Rational pharmacotherapy

It appears that the current situation in these fields is quite confusing. It is hard to assess the reasons for that, but it seems that there is no sufficient interest to fix the situation in this field. Primarily, even though it is obvious that huge amounts of budgetary funds unnecessarily go to drug consumption, there are no analyses of drug consumption, the level of information of the general population and healthcare professionals about drugs is low (starting from education in primary and secondary schools to the level of information about the appropriate use of drugs in cases of patients suffering from chronic diseases), and finally, what was proven in different meetings of medical and pharmaceutical chambers and associations and which can be proven in any clinic and outpatient facility of e.g. family medicine in Bosnia and Herzegovina, there are no standards regarding therapy for diseases in a sense of "the same drug for the same disease in the same age group".

Providing information on drugs

Conventional methods of providing information on drugs are still preferred in Bosnia and Herzegovina, so that in both entities there are annual publications on drugs, medical magazines such as the Medicinski Arhiv (Medical Archives) a magazine of physicians of Bosnia and Herzegovina, which is the only medical magazine in Bosnia and Herzegovina cited in the Index Medicus.

In the past couple of years, a slight increase of the level of information from the Internet was noted, as well as the use of different websites for the promotion of information on health services, diseases and little information on drugs.

Presentations on drugs are organized in order to promote new products in the market, where healthcare professionals, who usually do not have sufficient time to look for information on drugs, get more information on drugs. These presentations are organized usually once in two months. They are also organized for healthcare workers' chambers depending on the canton or entity where they are located.

If we were to compare the situation in BiH with the situation in other countries, we would say that very few things were done in this field even in other countries throughout the world. On few occasions only we may find considerable application of new information technologies for the sake of providing information on drugs. It seems that the application of new information technologies is unjustifiably reserved only for the developed countries.

Monitoring of drug consumption.

The problem of monitoring drug consumption is quite an enigma in Bosnia and Herzegovina. For a long time there have been attempts to introduce some order in this particular area, but there has been no success. Currently this situation is complicated even further, due to the fact that there is no possibility for centralized monitoring of drug consumption in the Federation of BiH. This problem is caused in particular by ways of financing healthcare at the Cantonal level, and the existence of Cantonal health insurance funds.

Depending on the financial power of the Canton, the funds for financing positive lists of drugs are allocated from the Cantonal health insurance funds. Cantonal funds need to plan the funding that they must allocate each year for financing drug procurement in Bosnia and Herzegovina, and they are therefore extremely interested in monitoring drug consumption at all levels of healthcare.

According to the information published by the working group within the Phare Project on financing drugs, it was recorded that the total expenditure for health in the Federation of BiH was 716 million KM, and of this amount 44 million KM were spent on drugs, which is about 6.1%.

So far there is only one way of monitoring consumption of prescribed drugs in the Sarajevo Canton (only in the Public Institutions "Pharmacies Sarajevo"), while this type of monitoring is not used in other Cantons.

Monitoring drug consumption is an important segment of the general problem of drug supplies in Bosnia and Herzegovina. All the facts indicate that very little has been done in that regard, regardless of all the recommendations, and that is the reason why we do not have a realistic picture of drug consumption in both entities. All the processes, from supply requisitions, stock renewals, storage, issuance and control of drugs and sanitary materials could be incorporated into a single computer application that might be used in all pharmacies. By using the same computer program, hospital, public and private pharmacies could report to the health insurance funds, or some other competent institutions, such as for example the future Centre for Drugs, which is obliged by law to monitor drug consumption, and by doing so exercise influence on the general situation with drugs.

The basis for the application, of course, would be the international

anatomic-therapeutic-chemical classification (ATC) of drugs, as a standard system of codes, and the standard for defined daily doses of drugs (DDD), for the sake of comparison of drug consumption at the international level. It is obviously possible to use the ICT to enable the reporting of drug consumption.

Monitoring side-effects of drugs

In most cases, the information collected during the pre-marketing phase of drug testing is incomplete in relation to side-effects of drugs. This also refers to the information on uncommon, but serious side-effects, chronic toxicity and drug application on special groups (children, older people and pregnant women). In addition, drug interactions are often incomplete or unavailable. Even the best drugs can be dangerous if administered in an inappropriate manner.

For all those reasons, it is necessary to establish a strong post-marketing monitoring mechanism. By monitoring side-effects of drugs, as well as other problems related to drug administration that could not become manifest during the pre-marketing trial phase (insufficient drug efficiency, interactions), a very solid basis is established for rational administration of drugs. Thus it is necessary to create a system of pharmaco-vigilance, which would monitor the negative aspects of drug application. This is the way to attain the best and most comprehensive knowledge regarding safe, rational and efficient minimum risk therapy, with drugs that are available on the market within one system.

Such system cannot be effective if not based on the usage of ICT. The simplest way to establish direct communication is through a website, which would explain in detail what the side-effects are, how to recognize them, and what the importance of monitoring side-effects of drugs is. A chat room, discussion groups and possible questions by medical workers (primarily physicians, dentists and pharmacists) would enable the competent experts to provide the necessary, scientifically valid information. Their identity could be protected, if so desired. A part of the information thus generated could be made available to the widest public. Unfortunately, BiH health care system dos not have even such simple possibilities.

Rational application of drugs

An essential requirement for drug administration is the welfare of the patient, and in order to achieve it pharmacotherapy must be based on all the postulates of contemporary science. Such an approach to medical treatment demands extensive knowledge, power of judgment, wisdom and a sense of responsibility. Irrational and superficial ways of prescribing drugs lead to inefficient and hazardous treatment, deterioration or prolongation of illness, patients' discontent and, finally, higher costs of medical treatment.

In addition to providing professional information and exchange of experiences with a certain drug, a database of the existing registered drugs and drugs that are currently being registered in Bosnia and Herzegovina would be priceless for the physician, and indirectly for the patient as well. On the other hand, a database would also provide information for the patient, who would contribute to more efficient treatment by getting more actively engaged.

3.9.3. CROATIA

3.9.3.1. NATIONAL HEALTHCARE ICT IMPLEMENTATION STRATEGY

The determinants for architecture of national healthcare information system have been based on:

a) National strategic documents:

- Croatian strategy for health and health insurance reform (Ministry of Health, June 2000)
- Strategy of Information and Communication Technology Development - Croatia in 21st Century (Draft Version January 2001, Final Version January 2002)
- National Health ICT Implementation Strategy (Government Steering Committee for Internetization, 2001)

b) International documents:

- eEurope Action Plans: 2000, 2002, 2005
- EU e-Health Strategy
- The eEurope Smart Card (eESC) initiative
- Selected National e-Health Strategies (GB, USA, Canada)

c) Health Information System Conferences and Forums:

- Conference on Health Information System and Telemedicine Developments, Zagreb, May 2001
- National Health Information System Implementation Conference, Zagreb, November 2002
- Cooperation on Sustainable Healthcare Strategies, 1st Central East and South East Europe Symposium, Zagreb, September 2003:
  - ü Implementation and Interoperability of Health Information Systems in Central and South East Europe: Major Issue of the Reform,
  - ü Sustainable Cardiovascular Healthcare and Technology Strategies for CE&SEEurope - Leading health and economy problem

d) Pilot projects:

Knowing the complexity of national healthcare information system and having experienced inefficiency and incompatibility of isolated legacy systems, competitive national pilot project approach has been started:

- Primary Healthcare Information System - Jun/August 2003
- Integrated Hospital Information System - Jun 2003

The strategic information requirements

The strategic information requirements are:

- to ensure patients can be confident that the National Health System (NHS) professionals caring for them have reliable and rapid access, 24 hours a day, to the relevant personal, medical and health information necessary to support their care
- to eliminate unnecessary travel and delay for patients by providing remote on-line access to services, specialists and care, wherever practicable
- to provide access for NHS patients to accredited, independent, multimedia background information and advice about their condition and to provide every NHS professional with on-line access to the latest local guidance and national evidence on treatment, and the information they need to evaluate the effectiveness of their work and to support their professional development
- to ensure the availability of accurate information for managers and planners to support local Health Improvement Programmes and the National Framework for Assessing Performance
- to provide fast, convenient access for the public to accredited multimedia advice on lifestyle and health, and information to support public involvement in, and understanding of, local and national

health service policy development.

Specific targets

The specific targets are:

- Reaching agreement with the professions on the security of electronic systems and networks carrying patient-identifiable clinical information
- Developing and implementing a first generation of person-based Electronic Health Records, providing the basis of lifelong core clinical information with electronic transfer of patient records between GPs
- Implementing comprehensive integrated clinical systems to support the joint needs of GPs and the extended primary care team, either in GP practices or in wider consortia (e.g., Primary Care Groups)
- Ensuring that all acute hospitals have the ability to undertake patient administration, including booking for planned admissions, with an integrated patient index linked to departmental systems, and capable of supporting clinical orders, results reporting, prescribing and multi- professional care pathways
- Connecting all computerized GP practices to NHS Virtual Private Network (NHS VPN)
- Providing 24 hour emergency care access to relevant information from patient records
- Using NHS VPN for appointment booking, referrals, discharge information, radiology and laboratory requests and results in all parts of the country
- The development and implementation of a clear policy on standards in areas such as information management, data structures and contents, and telecommunications, with the backing and participation of all key stakeholders
- Community prescribing with electronic links to GPs and the Prescription Pricing Authority
- Routinely considering telemedicine and telecare options in all Health Improvement Programmes
- Offering NHS Direct services to the whole population establishing local Health Informatics Services and producing hosted local implementation strategies
- Completing essential national infrastructure projects including the networking infrastructure, national applications etc
- Opening a National Electronic Library for Health with accredited clinical reference material on NHS VPN accessible by all authorized NHS organizations
- Planning and delivering education and training in informatics for clinicians and managers

Integrated Management and Control

- Management and control in Health System: strategic and operational patient relationship management, drug prescription, referrals, therapeutic processes performance and drug efficiency assessments.
- GP: Authorized access to distributed EPR and related medical document resources (images, laboratory evidences, diagnostics, etc.), emergency and crisis management, professional and administrative messaging management, personal performance management, health and medical reporting system.
- Public health: Healthcare Intelligence, evidence based management in public health, public health dynamics based on Population register.
- Ministry of Health and Social Care: Healthcare Intelligence, Health Performance Management, Business Intelligence, Health resources management
- Health Insurance Institute: Direct HL/7 communication on healthcare activities, ICPC-2 activity based costing, Evidence based Planning, Budgeting and Monitoring, Pharmacy management, drug consumption management.
- Patient: Direct control on Patient electronic record, Quality of service assessment and review, Patient Relationship Management, Privacy Audit and Reporting, Healthcare Service Ordering System, Public Related Health education, Discrete Selection/Change of GP.
- Public: Health condition of the population, transparency and benchmarking of public health services,

International Requirement

Functional and technological regional and international interoperability of National Health Systems, focused to meet EU e-Health goals by the end of 2005.

To serve, smoothly and cooperatively, any requirement for healthcare of any resident and/or non-resident during his/her stays in Croatia

National Smart Card

Implementation of National Smart Card, as a common multifunctional smart card infrastructure, serving multiple government and public requirements

Regional Initiative

- Multilateral: Interoperability of Smart Card based Health Services between Austria, Hungary, Italy, Slovenia and Croatia.
- Bilateral: Slovenia, Croatia: Joint meetings of Health Insurance representatives, Health Card operators, Government representatives.

3.9.3.2. PRIMARY HEALTHCARE INFORMATION SYSTEM

Functional Specifications

Primary Healthcare Information System is composed of two basic components: one Central System and several Client Systems.

Central System (G1):

- Primary healthcare information system management: health insurance management, patient management, electronic health documentation management, extended communications management, health information system reporting management.
- Clinical Information System Management: service management, data access and protection management, clinical documentation management, health related registers management (state, local), HL/7 communication system, clinical data management, "virtual" electronic health and electronic medical record management.
- Administrative and business support: Global registration management, health insurance database management, personal ID-management, national MKB-10 classification system, ICPC-2 classification system, drug, pills, orthopedic supplement list management, list of services and procedures.
- Privacy and security management: Smart card technology driven privacy and security for patients and healthcare professionals, user authentication system, role based data access control.
- Additional functionalities: External database access (medical and health libraries, e-professional education, registers), intranet and Internet communication.
- Technical and technological integration with the: Hospital information systems, Institute for public health information system, Institute for health insurance information system, Central state treasury system, Ministry of Health and social care information system.

Client System (G2):

- Health Professional: Role based Health Profession Identification, Authentication and administration services, Patient care service workflow, Diagnostics, Referrals, Prescriptions, Medical Services, Autoimmunization of patient health and medical document generation, Professional navigation services, Visit Management, Laboratory services, Calendar and administrative Management, Comprehensive Reporting System.
- Health and Medical Supporting services: Health documentation management, Clinical documentation management, Decease Related Drugs Recommendations, Drug Retrieval
- Patient oriented services: Visit registration and waiting room management, Patient identification, Authentication and administration services, Patient related medical documentation (laboratory, images, other), task list, procedures and memos, Patient Relationship Management,
- Patient Management: General Patient Data, Health insurance related data, Patient Health Data (Anamnesis, Risk factors, Allergies, Medical treatments, Health Problems, Chronic diseases,), Patient Medical Data, Vaccinations, Administrative document issued, Illnesses. Interoperability with core primary healthcare system: XML/HL7 Client Agent communications services.

Pilot project Implementations

- Primary Healthcare Teams (medical Doctors, Nurses) involved: 60
- Pilot Population (Insured in care) involved: 100.000
- Number of G1 Pilot implementers: 4
- Number of G2 Pilot Implementers: 7
- After Pilot results:
- Contracted National Implementers:
  - ü G1: Ericsson Nikola Tesla
  - ü G2: 6 qualified implementers

3.9.3.3. NATIONAL LICENSE FOR HOSPITAL INFORMATION SYSTEM

Functional Specifications

List of 3052 detail functional specifications has been specified. Tender document specifies 1500 higher-level requirement specifications.

The very high level functional specification contains following areas:

- Management and control: Consolidated strategic, strategic, tactical and operational management, Investment management, Business intelligence, Performance management, Controlling.
- General services: Accounting (managerial and financial) and general ledger, Payroll, Inventory management.
- Patient Management: Patient administration, patient accounting and billing, patient scheduling, patient service management, marketing and health promotion
- Diagnostics and therapy: Diagnostic support and ancillaries, clinical order management, medical and clinical documentation, treatment and operation, research and education.
- Care Management: Care planning, clinical care, care documentation, after care management.
- Hospital and health system communication: Internal communication, communication with providers, communication with payers, communication with patients, communication with suppliers
- Support services: Medical technology, environmental health and safety, transportation, facility services, Health and Medical document management, Patient information center (help desk)
- Business support: Human resource management, procurement, treasury/corporate finance management, fixed asset management, real estate, equipment maintenance
- Interoperability: medical equipment data communication, external professional and administrative communications

Pilot project Implementations

Pilot Hospitals: Sveti Duh, Zagreb; Dubrava, Zagreb, Rijeka, Split

Pilot implementers: B2B (SAP), IBM Croatia (Cerner), AME Consortium, Ericsson Nikola Tesla

The winner of competition in Pilot implementations is planned to earn the National license for Hospital Information System.

Projects

First initiatives dated by 1999 (Academy of Medical Sciences).

- Telemedicine Services for Islands and Remote Areas - Supported by Ministry of Health, the project of telemedicine for island started in 2000 (The first step including four islands in the Krk-Cres-Losinj archipelago resulted by success.)
- Virtual Polyclinic Network, which started in 2001, involves the islands Cres, Lošinj, Krk, Šolta, Braè, Vis, Lastovo, and Mljet and connects to five consulting units in Rijeka and five consulting units in Zagreb.
- National teleneuroradiology network including more then 30 CT stations is in production. National telepathology and teleradiology network is in function.

Conferences

- Development of Telemedicine in South East European Region, Dubrovnik 2001
- 1st Croatian Congress on Telemedicine with International Participation, Makarska, 2002

Institutions and postgraduate study

- Academy of Medical Sciences - Island Telemedicine
- Croatian Medical Association - Croatian Society for Telemedicine
- Reference Centre for Computed Surgery and Telesurgery of the Ministry of Health of the Republic of Croatia
- Telemedicine in the postgraduate studies at the Zagreb University School of Medicine

3.9.4. MACEDONIA

So far in Macedonia, there are no indications that something is done or started concerning the e-health initiative in the country. There are several web sites of medical service providers where only some basic information for the subjects themselves and the type of the offered services can be found. On the other hand, the situation with the Medical Information Systems in the country is very different, varying for every provider of medical services differently and it is much harder to get to some concrete data. The variety of IT solutions goes from Financial Applications, to Integrated Medical Information Systems (Clinical Center Skopje, Medical Center Prilep, Policlinics Zelezara Skopje, and others). Clinical Center Skopje is the biggest health care organization in Macedonia, with more than 30 clinics, Pharmacy, Labs, and X-ray Department. There are more than 200 end users of the Clinical Information System (CIS). The IMIS (Integrated Medical Information System), consist more than 20 modules including Inpatient, Outpatient, Pharmacy, Lab, X-ray, as well as Administration and Billing (Billing, Inventory control, Accounting, Plan and analyses, Salary, Assets, Cash flow etc.). Some

larger clinics, or group of clinics, are using add-on modules (like Cardiovascular, Surgery, Psychiatry, Pharmacy, and X-ray).

Also, a very good example of Integration is the Special Hospital for Orthopedic Surge and Traumatology "St. Erazmo" - Ohrid with several integrated modules: Administration, Pharmacy, Invoicing, Ambulance, Departments system, and Accounting. They have started with some sort of telemedicine services. The hospital through its web site offers a possibility for teleconsultations through Internet for all medical and scientific institutions as well as for everybody interested in teleconsultations. Consultations are based on the analysis of medical verbal and graphic data: color or black-an-white photos, radiographs, tomograms, ultrasonograms and other data of clinical and instrumental examination.

There is a clear tendency to develop and implement a Health Insurance Portal as part of Health Information System Component of the Project for Reform of Health Care System in Macedonia with loan provided by the World Bank. This Portal will affect Health Insurance Fund (HIF) in order to help them provide secure channel for data exchange between HIF and insurers and employers, health care providers, pharmaceutical vendors and state administration authorities. The project will probably start at the end of 2004.

3.9.5. MOLDOVA

3.9.5.1. BASIC INDICATORS IN HEALTH PROTECTION

In the table below you may find some general information, which can give an insight into the health system in the Republic of Moldova.

	1995	1996	1997	1998	1999	2000
Medical workers of all specializations, thousands	17.2	17.2	16.5	16.3	15.7	15.2
Medical workers per 10,000 inhabitants	39.6	39.9	38.3	38.0	36.7	35.6
Number of female medical workers	9398	9574	9624	9825	8789	8451
Percentage, in ration to the total number of medical workers	55	56	58	60	56	56
Doctor's assistants, thousand	45.0	43.0	42.1	40.7	35.9	34.31
Doctor's assistants per 10,000 inhabitants	103.9	99.6	97.7	94.9	83.9	80.5
Hospital beds, thousand	53.0	52.5	50.1	48.3	35.1	32.4
Inhabitants per one hospital bed	82	82	86	89	122	132
Beds per 10,000 inhabitants	122.3	121.4	116.4	112.4	82.0	76.0

3.9.5.2. INFORMATIZATION OF THE HEALTH SYSTEM

Some international projects involving the State University of Medicine and Pharmacy "Nicolae Testemitanu" (SUMP) and its partners from France and the USA led to establishment of the Center for Health Informational Resources by the University of Medicine and Pharmacy, the Informational Center "INFOMEDICA", and other. The IMCO Company, in cooperation with MoldData, created an informational system iMED (http://www.medicina.md/). A number of private medical institutions extend consulting and informational services on health problems via Internet. However, activities in the e-Health sector are just at the initial stage.

The Center for Health Informational Resources was inaugurated in March 2000. Organization of this Center was enabled owing to contributions of two organizations - a Moldova-France Association "Yvonne Aimee", which donated technical equipment to the Center, and AIHA (American International Health Alliance) - organization that implements partnership programs between the US medical institutions and their partners from NIS, Central and Eastern Europe and that sponsors Internet access of the Center. The State University of Medicine and Pharmacy "Nicolae Testemitanu" is also a member of one of the AIHA partnerships.

The Center provides free access to Internet to the following beneficiaries: students, interns, masters of Science, PhD students, teachers and lecturers, and other categories of SUMP's staff.

According to the Regulations, each user can have access to Internet one hour a day, which will thus enable many beneficiaries to use the Center's resource.

At present, the Center for Health Informational Resources offers the following services:

- Internet access for all students, PhD students, Masters of Science, teachers and lecturers, all the staff of the University,
- Web addresses of Internet resources related to medicine,
- Access to collection of CD-ROM Cochrane,
- Access to OVID databases, the database of the US National Medicine Library, etc.,
- The Center provides services to 50 persons daily.

The Information Center "INFOMEDICA" was opened on January 15, 2003 and has today 5 labs and 60 computers connected to Intranet and Internet.

Organization of this Center was possible owing to contributions of AIHA, Hospital Group "St. Augustine" from Malestroit, France, and the State University of Medicine and Pharmacy by "Nicolae Testemitanu".

The Informational Center "INFOMEDICA" mainly directs its efforts towards efficient development of informational infrastructure in medicine and pharmacy and considers it its mission to collect ideas, generate connections, to place at the disposal of our local medical community some learning and evaluation tools, to cooperate for improvements in the medical education.

The Informational Center "INFOMEDICA" has the goal to promote access, distribution and exchange of information on medicine and health. The main objectives are:

- Efficient development of informational infrastructure in medicine;

- Formation and organization of a corpus of electronic documents related to medicine;
- Facilitation of free and non-discriminatory access to educational, scientific and cultural resources available on Internet;
- Access to local and international medical databases;
- User training to efficiently use digital informational resources related to medicine;
- Support to educational, information, research and training activities in medicine;
- Serving a study and research center for the medical community;
- Interconnection of medical institutions in order to communicate, inform, cooperate and share resources;
- Promotion of advanced technologies, building competence, support to development of medical training and research helped by ICT

Today, the Informational Center "INFOMEDICA" offers 60 computers for the users who wish to access digital informational resources, local and international databases, resources and catalogs of medical libraries via Internet, medical information stored on CD and DVD etc., organizes computer training courses (Windows and navigation in Internet) for lecturers and other staff of the University.

The private medical sector is presented on Internet by many sites and web pages demonstrating various degrees of complexity, from simple information to online consulting facilities and services. Below you may find some examples:

The Information System "iMED" (http://www.medicina.md/), available in 5 languages, was developed for Internet users with the purpose of granting necessary information in various medicine areas (over 100 system's domains). System "iMED" contains the actual information on the following subjects:

- Over 4000 registered drugs in Moldova, and main drug manufacturers
- Approximately 250 most widespread illnesses in Moldova with characteristic symptoms
- Drugs used for the given illnesses treatment
- Medical institutions in Republic of Moldova
- IMED informatics system falls into the following compartments
- Medicine - a direct functional relationship between several databases that assures the realization of a complex circuit: "Symptoms - Diseases - Drugs - Treatment Standards- Medical Institutions"
- News: medical and pharmaceutics activity news; health protection news
- Presentations: new products and services of a health institution or a specialist presentation page
- Legislation: laws and other standard law documents, which settle medical activity in the Republic of Moldova
- References: links to the most popular Internet medical resources
- Forum: a forum page on different subject matters both for specialists and other users
- E-mail Server: mailboxes with electronic addresses of the name@medicina.md, name@medicine.md, etc, type

iMED informatics system has been developed and implemented by the IMCO Company in collaboration with MoldData Company. Creation, implementation and development works of "iMED " were carried out under the "iMED" Consulting Board's direction.

A private gynecologist's office "Nicolae Tafuni"[87] - is to help the young, elder persons and spouses to use efficiently and correctly the bulk of information related to sexual issues, to recommend possible solutions for examination by specialists, etc.

The National Research and Development Center of Preventive Medicine (http://sanepid.design.md) offers press releases on sanitary and epidemiological issues, edits a monthly leaflet on these issues, gives information for medical workers and all those who are interested in it, including information on HIV/AIDS.

A non-governmental association AVE-Natura, on its page http://www.iatp.md/mediu-sanatate/, presents stuff about influence of environment on health. The page is sponsored by IATP.

The Codex Alimentarius Program in Moldova Internet page (http://www.codex.sanepid.md/) is managed by National Codex Committee that is called to be the central co-coordinating and advisory body to the Government on matters of food quality and safety and to play the key role in the overall national effort to update and strengthen the Moldova's food control system.

3.9.6. SCG - KOSOVO

E-Health in Kosovo is still a long way ahead. The first steps are just being undertaken. The biggest obstacles towards the development of e-health are concentrated around the lack of proper regulative in the field of ICT for health, lack of staff trained in e-Health working in the health sector, lack of funding and also lack of capacity in the Ministry of Health to define and conduct a clear strategy for ICT in health.

Health facilities in Kosovo are generally equipped with computers and most of them have connections to the Internet. What presents a real problem is that these resources are not utilized in a way that would benefit the public. There is little or no means for patients to get advice from health practitioners through web pages or e-mail, and there is no available web resource offering medications to public.

A major obstacle in development of e-Health in Kosovo is lack of ICT professionals working in this field. Not a single institution in the health sector has an IT department or IT focal point. Not a single employee is marked as IT Technician or anything similar in HR rosters. In addition, there is no budget, inspiration nor tradition for outsourcing IT services. The closest posts of people which actual duties vaguely correspond to those of IT focal points are acknowledged as statisticians. These in some cases handle minor ICT issues, but mostly in a very incompetent way. Thus, most of ICT needs are being handled in an uncoordinated way.

Moreover, the healthcare facilities have no budget for ICT equipment and Internet connection. Even though facilities are supposed to plan the budget according to separate and specific spending budget lines, most of the spending goes in only two general budget lines; Goods and Services, and Capital Outlays. While the social security system in Kosovo is not regulated in a way that could allow the healthcare sector to focus on anything else than core health services, the struggle for purchasing medicaments will without doubt, outweigh in the sparse budget. For 2003, the budget provided €59.6 million for Health Sector spending which is roughly equal to the 2002 actual level. The 2003 allocation represents about 12% of total general government spending[88].

87 http://cspms.mednet.md/sexologie/

88 Kosovo General Government 2003 Budget, December 2002). (www.unmikonline.org/civiladm/cfa/2003KBudget_eng.doc)

Having in mind that ICT is not among the priorities in health sector, it is very hard to define how and who would introduce ICT equipment and connectivity costs in the actual Government budget.

Starting in 2000 and continuing after, funded by European Agency for Reconstruction, there were two projects related to ICT in Health: "Capacity Building" and "Activating Health Systems". These efforts, together with the active involvement of the Ministry of Health, lead to development of the currently two major components of e-Health in Kosovo: Telemedicine Centre of Kosova and Health Information System.

Health Information System (HIS) (www.aggs.de/kosovo/index.htm) provides an integrated management information system for collection and analysis of data in the health facilities and in the Ministry of Health. HIS covers 34 health institutions of primary, secondary and tertiary healthcare. For the moment, HIS is lacking on-line alternative mostly due to the deficient ICT infrastructure. However, it has been designed in a way that enables on-line transition at any moment that the infrastructure is available.

Telemedicine Centre of Kosova (TCK) (www.ivhospital.org) is established with the intention of providing consultation and connection between University Clinical Center in Prishtina and Regional Hospitals in Kosovo and between Kosovo and health centers around the world. To date TCK has established connection with the Clinical Center in Prishtina and between hospitals in Prishtina and Peja.

Other hospitals are in the process of being connected. TCK also provides electronic library services, health magazines and textbooks, for medical students and health professionals free of charge. For the moment, TCK does not provide telemedicine consultations to public either on-site or on-line.

3.9.7. SCG - MONTENEGRO

Project Control of distribution and usage of medicines through the state pharmacies gives the good results in implementation. There is a database of all sanitary assured, which is the base for primary and secondary sanitary protection.

Montenegro with 670.000 habitants, relatively small territory and differences of geographical structure is ideal area for development of telemedicine. This should to respect all specialties as: rural and non-rural areas and present network of sanitary protection on all levels.

Ministry of Health, with the foreign consultants from World Bank, works on the project Telemedicine. The project is in pilot phase for municipalities: Podgorica (center), Bar (south) and Berane (north). The aim of Project is to initiate the development of Telemedicine in Montenegro with demonstrating of its potential in cardiology. Developed technology model should to present the "core" of future global system of telemedicine network. The close of project and test phase is planed for this year.

Actual problems within the technical support of telemedicine service are: low develop of local networks in health care system; non existence of connection of medical equipment and non existence of local data base of digital signals cold be integrated on global level.

Institute of health has its information system and its main function is data processing about the health of citizens and of their health care. Within the Center of epidemiology, from 1994, a database of data of contagious diseases exists and it is regular updated. This program should be expanded on the all municipalities in Republic.

The conclusion is that medical electronic resources are non-developed and it is necessary as soon as possible to undertake the proper measures in overrun of this problem.

3.9.8. SCG - SERBIA

Priority actions needed in domestic environment in ICT in health are directly taken from eEurope + process.

The main being the following:

- Definition of ICT policy for health
- Use of online technologies to the availability and quality of health services
- Development of health telematics infrastructure, including regional networks for primary and secondary healthcare providers
- Establish links with Public health networks and database
- ICT for health professionals
- Training of professionals in healthcare

Within Ministry of health in August 2002 was formed Sector for international cooperation and project coordination. Cooperation between Ministry of Health and World Bank resulted in realization of following projects:

- SPEAG - Social Protection and Economic Assistance Grant - Grant was directed to the whole social sector. Ministry of Health got 500.00 $ which are used for development of communication system for Ministry of Health and other institutions for health protection and for introduction of new technologies in our health system.
- PHRD - Public and Human Resource Development- the resources of 500.000$ are used for couple of purposes:

  1) to make available all data for development of Health Policy and to develop system for efficient use of available information and data,

  2) to improve the quality of approach to medical institution by implementation of Master Plan,

  3) to strength the public health system,

  4) to reorganize and modernize financial system of health protection.

- SAC - Structural Adjustment Credit (70 M USD)
- SOSAC-Social sector Adjustment Credit (80 M USD)
- The project "The Health of Serbia" -part of the project is also development of standards for health information system. The deadline for this part was December 2003. (The whole project worth is $20 million)
- The project "Energetic efficiency" (21.M USD)

Bilateral projects and donations were realized with Japan, Norway, and China. In cooperation with Norway, three projects were realized with one of them under the title "The Development of Information System for Belgrade Pharmaceutical Institution". Project enables equipment and software supply worth $55,000.

Other international institutions and donors in this area are: European Investment Bank, ECHO, UNDP, UNICEF, International Red Cross, EPOS, Global Fund, USAID.

3.10.ICT INDUSTRY

3.10.1. ALBANIA

Most ICT products are delivered from abroad, but there is a strong and growing tendency of the ICT sector to adapt products to local needs. Some software is available which has been adapted to local needs and languages. A variety of hardware and software solutions is available and elements are affordable for most SME businesses, as well as for many individuals. The average yearly investment in ICT is about 2.5-3M USD, and the overall ICT turnover is around 20M USD.

There are several types of enterprises working on ICT:

- Resellers of ICT products
- Software developers
- Design, installation and maintenance of ICT infrastructure
- Design, implementation and maintenance of wireless systems

Because the market is small, number of these enterprises is small. In the Guide of Tirana we find some reduced data. Even reduced data, they tell us about the size of the market:

Year	Computers and Services	ISPs	Net-Cafes
2002	18	5	11
2003	26	7	16

Normally these enterprises sell computers, applications, and Internet access. Only one enterprise, which covers about 50% of PC market, has developed it's own PC recognized by Microsoft as "designed for Windows" and included in respective catalogue.

Software development enterprises are involved with production of some local application packages, for example for accounting based on local legislation, or design of web sites. Some of them collaborate with foreign companies. This market would be much more developed but for a complex of factors related with country's size and transition period. Thes include brain drain with respect to ICT experts, difficulties with Internet access, a small local market, and low and/or unstable incomes from software development.

There are emerging companies that work in electronic data transmission infrastructures. However, state policy in the telecommunication sector is not stable. The monopoly status of Albtelecom has been extended two times, with the current period being from 2002 until the end of 2004.The potential of relationships with other operators is disputable since many cases of litigation with different circles and bodies exist.

3.10.2. BOSNIA AND HERZEGOVINA

According to many reports, economic situation in Bosnia and Herzegovina in 2003 was not dramatically different from the situation in 2002. Even in 2004, there is no record of significant change[89]. Thus, the indicators for both 2002 and 2003 could be also considered appropriate for assessment of the cuurent (2004) status of Bosnia and Herzegovina. Bearing in mind availability and reliability of indicators related to the ICT industry of Bosnia and Herzegovina, the current assessment has been made in accordance with the following segments:

- State of production and services in the ICT industry in Bosnia and Herzegovina
- Approach and use of ICT in Bosnia and Herzegovina (through which

Today, there are over 250 companies existing in Bosnia and Herzegovina that deal with the production of IC equipment and services:

Business Activity		No of Companies
1	Production of computers and other data processing equipment - DL/30.02	> 50
2	Production of insulated wire and cables - DL/31.30	4
3	Production of electronic tubes and other electronic components - DL/32.10	6
4	Production of TV and radio transmitters and wire phone and telegraph equipment - DL/32.20	14
5	Production of TV sets, radios, and similar equipment - DL/32.30	4
6	Production of industrial process control equipment - DL/33.30	5
7	Telecommunications - G/52.72	> 25
8	Renting office equipment, machines and computers - K/71.33	4
9	Consulting on computer equipment - K/72.10	> 25
10	Data processing - K/72.30	> 20
11	Data base construction and maintenance - K/72.40	> 20
12	Other related computer activities - K/72.60	> 20

[89] According to Early Warning System, UNDP BiH, the Economic stability index has not been changed more then 2 percent during the period from March 2002 and June 2004.

The following operators and service providers perform their activities in Bosnia and Herzegovina:	
Telecom operators of fixed phone network:	BiH - TELECOM
	RS TELEKOM
	HT - MOSTAR
Telecom operators of mobile phone network:	BiH - TELECOM
	TELEKOM SRPSKE
	HT - MOSTAR
ISP	>40 licensed companies
Network operators:	>58 licensed companies
TV stations:	>35 licensed companies
Radio stations:	>90 licensed companies
Cable TV operators:	>8 licensed companies

the communication infrastructure was treated)
- International competitive ability of Bosnia and Herzegovina in domains relevant to the ICT industry
- Advantages and disadvantages of the current state

3.10.2.1. PRODUCTION AND SERVICES

It is difficult to tell which is more important today, and which is less available in Bosnia and Herzegovina: A modern, market-oriented economy or an efficient state (or both). The reality is this: factories without real production, taken out from their natural production environments and driven away even from those markets in which they used to be affirmed, state government without managerial resources and available updated and accurate data, public and utility companies and service providers with no resources to prepare for the renewal of dilapidated infrastructure. Of course, main problem in BiH is the chronic lack of money, and the fact that we can hardly achieve progress without considerable financial injections from abroad and extra efforts in domestic financial market.

Current production in Bosnia and Herzegovina is mostly related to the work of local work force in accordance with a foreign license.

Achieving new products requires the existence of knowledge, courage and labor that lead to strengthening of our abilities and belief that "we can do it". As opposed to that, production in accordance with a foreign license stifles creativity, extinguishes the belief in own forces and leads to technological apathy and dependence on foreign countries.

In Bosnia and Herzegovina, the problem of placement of computers and computer equipment is connected with unforeseeable behavior of BiH market, meddling of politics into market relations (because of which the domestic product loses its chance against the foreign product or against a product that is domestic only because of the label on it).

There have been significant changes in the ICT infrastructure in past years. The quality of the infrastructure has been improved, and the number and volume of communication services has been increased.

The telecommunication sector dominates the ICT industry in Bosnia and Herzegovina. Profit from telecommunication services, as in most poorly developed countries, significantly dominates the total income made in the ICT industry. The share of the existing three telecom operators in GDP of BiH is 8,5%.

However, even though the number of Internet hosts and computers in BiH has increased, it has also increased in other countries, so, on the basis of available indicators for the previous three years, we can say that the comparative position of BiH has not changed significantly.

The worst current state in the ICT industry today is the research and development programs. We can say that there are no research and development programs in the ICT industry.

3.10.2.2. INTERNATIONAL COMPETITIVENESS OF BIH IN THE AREA OF THE ICT INDUSTRY

The factors that are most relevant to the ICT industry in BiH are[90]:

Human Resources

The following personnel is relevant to the ICT industry: electrical engineers from all departments, especially informatics specialists, informatics engineers, application programmers, system engineers - administrators, repairmen, economists of informatics direction, managers, etc.

BiH belongs to the middle group of countries in relation to availability of education in mathematics and science in schools, and availability of scientists and engineers of traffic, communications and financial mediation. On the other hand, BiH is at the very bottom with regard to having a high unemployment rate and an significant talent loss scientists and engineers who are leaving BiH.

[90] Primary source: "Report on Competitiveness of Bosnia and Herzegovina for 2002", The Science and Arts Academy of Bosnia and Herzegovina (ANU) and the MIT Center of the Faculty of Economy in Sarajevo. The Report analyzed the competitive advantages and disadvantages of Bosnia and Herzegovina through the analysis of 10 internationally recognized factors, with groups of total of 184 criteria that determine the competitive ability of a country in accordance with the methodology of the World Economic Forum (WEF). All the criteria are not equally relevant to individual sectors or industries. The data from the Report on Competitiveness of Bosnia and Herzegovina were used in the analysis of the current status of the ICT industry in BiH.

It is fortunate that the education of electrical engineers in BiH, at departments of informatics, telecommunications and electronics, was intense prior to 1992 (at the Faculty of Electrical Engineering in Sarajevo, a total of 1922 students graduated in the period since its founding in 1961, until April 30 1992 within the Departments of Informatics, Telecommunication, and Automatics, and Electronics). After 1995, the trend did not reach the state from before the war (in the period of 1 January 1996 - 31 December 2003, the total number of 405 students graduated at Departments of Informatics, Telecommunication, and Automatics and Electronics).

Highly qualified IT staff find good, well-paid jobs in BiH in the areas of: electrical power supply and mining, financial mediation, construction and processing, somewhat less well-paid jobs in the area of wholesale and retail trade, communications and traffic, agriculture, game and forestry, and worst-paid jobs in the area of real-estate and catering.

Knowledge and skills improvement

In the knowledge resource, it is necessary to perceive the crucial difference between the general knowledge acquired in the education system and specialist knowledge acquired in companies with permanent training with the aim of sub-specialization.

Companies' investments in the development of the IT skills with their employees put BiH in the middle group of countries, but that is still insufficient considering the current state in the ICT industry in BiH. The most investments go to the area of financial mediation, then to the areas of electrical power supply, wholesale and retail trade, and least to areas of catering, communications and traffic, processing, construction, game and forestry and mining.

Small and large enterprises invest more than mid size companies.

Capital resources (Financial System)

The most important institutions in the area of financial system of BiH are the Central Bank, as an issuer that functions on the principles of the Currency Board Arrangement, and commercial banks of the universal type.

The monetary market, unfortunately, was not initiated in 2002, either, and there are no money market instruments (short-term financial instruments: short-term bonds, bank notes, commercial notes, certificates of deposit,), and there are signs that any of the financial institutions is in preparations to issue them. That is a great handicap of the financial system of Bosnia and Herzegovina, since it lacks this major segment (monetary market).

The capital market of Bosnia and Herzegovina functions at the level of two entities, which presents a great handicap for a small market like BiH. All the regulation and institutions of this market are placed at the entity level. The trend of changes in this market and the number of professionals included show constant growth.

Two Stock Exchanges, Banja Luka and Sarajevo, have been operating more than two years. We can say that the capital market is developing, but it is necessary to regulate it at the state level, so that an exchange market could be organized for the entire BiH. This would also enable linking with other capital markets in the region. The decisive role in the linking process would be played by ICT.

The foreign currency market of BiH is also undeveloped and functions only through the Central Bank, that, on the basis of the collected foreign currency funds, issues the Convertible Mark as a domestic mean of payment. Such market is insufficient for the state economy.

BiH belongs to the very bottom in case of sophistication of the financial markets, the possibility of providing external sources of investment funding, possibility of receiving credit with good business, without the collateral and possibility to provide finance for innovative, but risky projects. On the other hand, the entrance of foreign banks to local banking business and the influence of the financial market on the interest rate levels places BiH in the upper group of countries.

Local market competition

Local competition, as an element of the business environment, has a direct influence over the creation of competitive abilities of domestic companies. The influence of the domestic competition must be such that it directs the companies towards the increase of the market competitiveness, and not the protection from the competition.

BiH is at the very bottom in case of the anti-monopolistic policy, regulatory standards, easiness of staring new businesses, sources of local competition, the numbers and quality of local providers, existence of clusters and sophistication of buyers in the country. On the other hand, BiH is at the very top relative to the possibility of introducing new competition to the local market.

The situation is also unfavorable in case of the competition factor at the local electronic trade market. The factors show that the method of work of the electronic trading companies in the country is almost solely local.

The situation is somewhat more favorable in case of the factor of software products sold in the country that shows that these products in their original concepts are largely compatible with local needs. The B/H software companies are also very much oriented to markets of neighboring countries.

The information hardware production factor shows that this type of production has just started, and that it lags behind the most developed world economies.

The factors that relate to the volume of local software and number of companies that offer software services, and compete in the local markets, point out the competitiveness of local markets and relatively high participation of domestic software.

Business activities and company strategies

The crucial prerequisite for successful business of a company is quality top management and a clear business and strategic direction of the company. BiH has a very limited number of quality top managers, and with that a very small number of successful companies, mostly due to the absence of the society value system that would highly value the top managerial jobs, to the complete lack of quality education centers for the education of top managers, and due to insufficient encouragement for top managers to improve their knowledge and skills.

BiH is almost at the very bottom with regard to all the issues in this area, and some of them are: competitive abilities of local companies in the international markets, procurement of new technologies, production processes in the country, customer orientation, marketing development level, fees for the work done, competency of major managers and management schools in the country.

3.10.2.3. ADVANTAGES AND DISADVANTAGES OF THE CURRENT STATUS

Indicators of the status of the ICT industry in BiH and estimate of the competitive ability of BiH provide the image of great development variability

of the conditions for the ICT industry development, which can only be understood as a consequence of unorganized approach to this area. We can also perceive how essential the development of the ICT industry is, considering the needs of BiH, and the fact that the basic prerequisites either are in a good state or follow the trend of development.

In addition to the stated advantages, one also needs to perceive the disadvantages in a realistic way. The disadvantages that a country shows can easily become advantages in most cases, if those disadvantages are detected in time, and if the development strategy does not neglect the measures to overcome them. It can be expected that for example, the size of the BiH market will influence the ICT industry to accept the approach oriented towards exports, from the very beginning. In addition, it is easier to realize certain activities from the very beginning, than to correct them under the pressure of existing bad practices.

Even with the average of unsatisfactory indicators of the current state of the ICT industry in BiH, none of obstacles related to the ICT industry present a long-term threat to its development.

3.10.2.4. ENVIRONMENT

Legislation and regulation

The ICT industry is considered a "new" line in the economy of Bosnia and Herzegovina, subject to the same general legislation and regulations as businesses, from other industries of the BiH economy. This, in truth, is not an entirely new industry, considering a large number of legal persons that make up the industry, that have existed and worked for a large number of years, organized on somewhat different basis an with different goals.

The problem of legislation and regulation improvement for the economy of BiH has been analyzed and defined in the Development Strategy of Bosnia and Herzegovina (PRSP)[91] which relates to the period of 2003 to 2007. The PRSP approach completely incorporates the ICT industry and its general needs. However, the analysis of the planned state regulation measures indicates the need to adopt, modify and harmonize individual acts and regulations, with the aim to realize the planned measure that should stimulate the development of the ICT industry in BiH. That is especially true of the legislation and regulation related to: customs, taxes, finance, local and international trade, e-Business, etc. By realizing these activities related to the legislation and regulation, a better and crucial environment for the needs of the ICT industry would be achieved.

Institutions and associations

The development of the ICT industry is related to the work of authorities and association related to this business area. The most relevant institutions, on the work of which the development of this industry directly depends are: authorized Ministries of Economy and Trade, ministries and institutions for education and scientific and research activities, ministries of communications and transport, institutes for statistics and standardization, chambers of commerce, associations of the ICT industry, etc.

ICT Standards in BiH (BAS Standards)

Today, the basis for the work on standardization in Bosnia and Herzegovina is comprised of the Law on the Establishment of the Institute for Standards, Measurements and Intellectual Property of Bosnia and Herzegovina, and the Law on Standardization of Bosnia and Herzegovina[92].

The basis for drafting of the BiH standards are international (ISO, IEC), European (EN), and in special cases, other standards.

BAS standards are the result of joint efforts of experts gathered in technical committees, who work in accordance with current principles of standardization, rules of practice and directions of the Institute.

The technical committees relevant to the ICT industry are:

- TC 1 Information technology
- TC 5 Telecommunications

Other committees that prepare standards relevant to the ICT industry:

- TC 15 Electromagnetic compatibility
- TC 19 Electric installations in buildings
- TC 30 Electric cables
- TC 18 Energy transformers, measurement relays and protection equipment
- TC 10 Equipment for the measuring of electrical energy use and damage control
- TC 3 Quality management and quality guarantee
- TC 7 Environment

Published standards are available to all interested persons for use and application. BAS standards are not mandatory, and their mandatory application may be triggered by contract obligations or other basis.

The application of BAS standards and other documents of recognized rules of practice is carried out with personal responsibility.

TC 1 and TC 5 technical committees are among the most active of committees of the Institute. Published BAS standards are relevant to the ICT industry; they simplify the use of existing and new technologies, reduce costs and complexity, open markets and facilitate the access to products and services.

3.10.3. CROATIA

ICT industry in Croatia is characterized by relatively large number of small-sized companies and small number of large-sized companies. Leading ICT industrial capacities are accommodated at the local branches of Ericsson and Siemens multinational companies - Ericsson Nikola Tesla d.d. and Siemens d.d. World leaders like IBM, Microsoft, Oracle, SAP, as well as many others, have its local representatives. Small satellite-like companies are building partnering networks around the foreign principals.

There is a new positive tendency of ICT consortium and cluster establishments initiated by large national projects like National Health Information System (Ericsson Nikola Tesla Health Consortium - potentially new Croatian ICT export product). Respecting the requirements of Information Society and respective Information Society Technologies, there is significant potential for the new players on the emerging market.

ICT as a new industry sector is evident in rank of ICT companies in Croatia's 400 largest companies (one company is in the first 100). ICT has a branch within the Croatian Entrepreneurs Association.

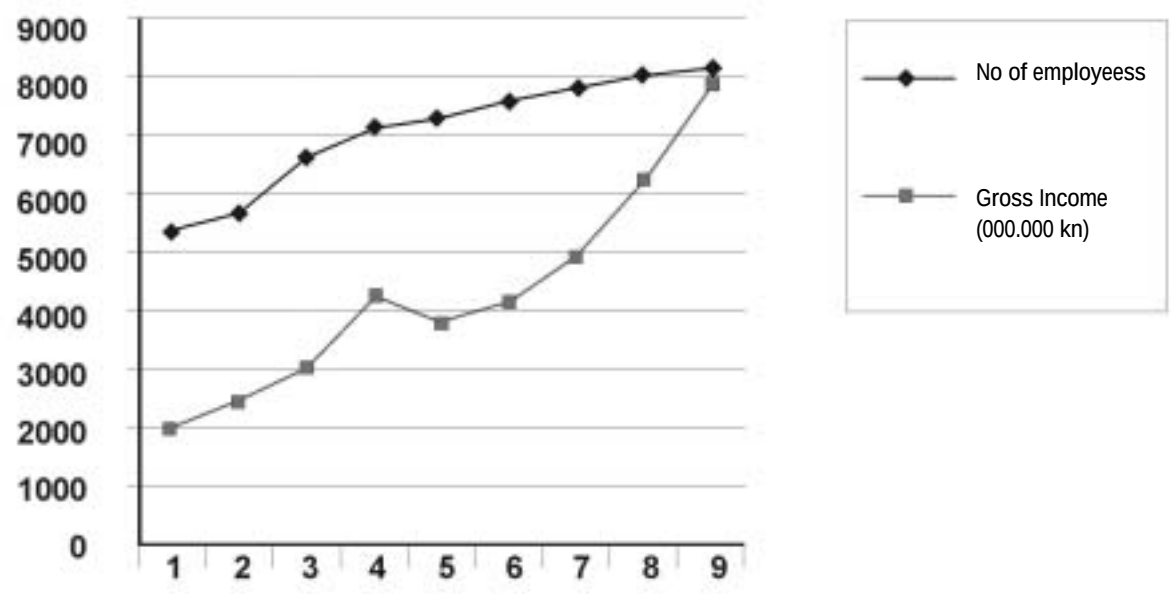
[91] PRSP - Powertry Reduction Strategy Paper, BiH, 2004.

[92] "Official Gazette of Bosnia and Herzegovina", NO. 19/01

Number of IT Companies

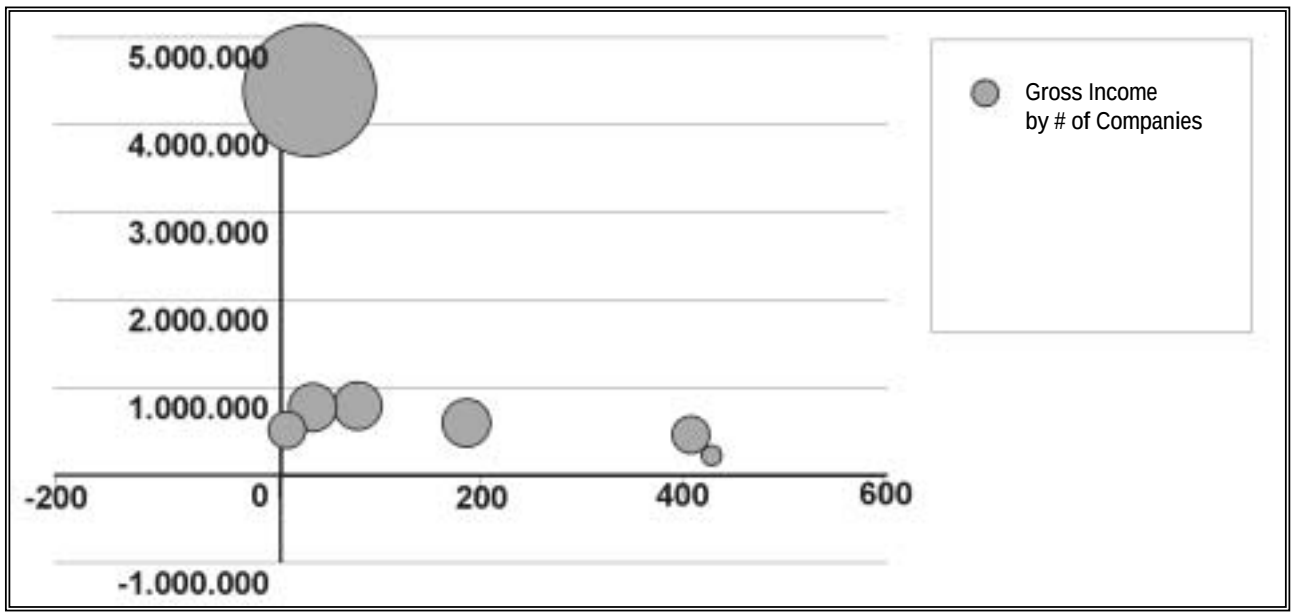
Year	No of ICT companies	No of employees	Gross Income (000.0 00 kn)	Gross Profit (000 kn)
1994	1.326	5.468	1.925	69.872
1995	1.610	5.646	2.381	99.976
1996	1.711	6.594	2.956	153.097
1997	1.772	7.114	4.212	190.381
1998	1.746	7.178	3.725	183.075
1999	1.713	7.413	4.078	211.638
2000	1.704	7.693	4.863	323.381
2001	1.509	7.943	6.284	316.937
2002	1.538	8.180	7.784	381.949

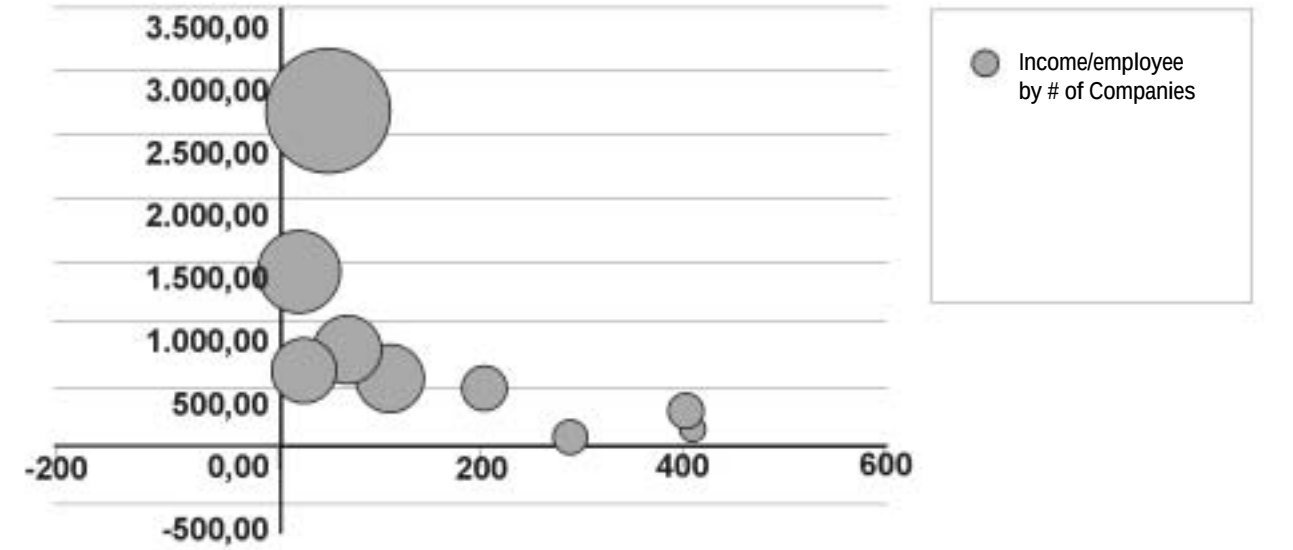
Source: Infortrend 10/2003

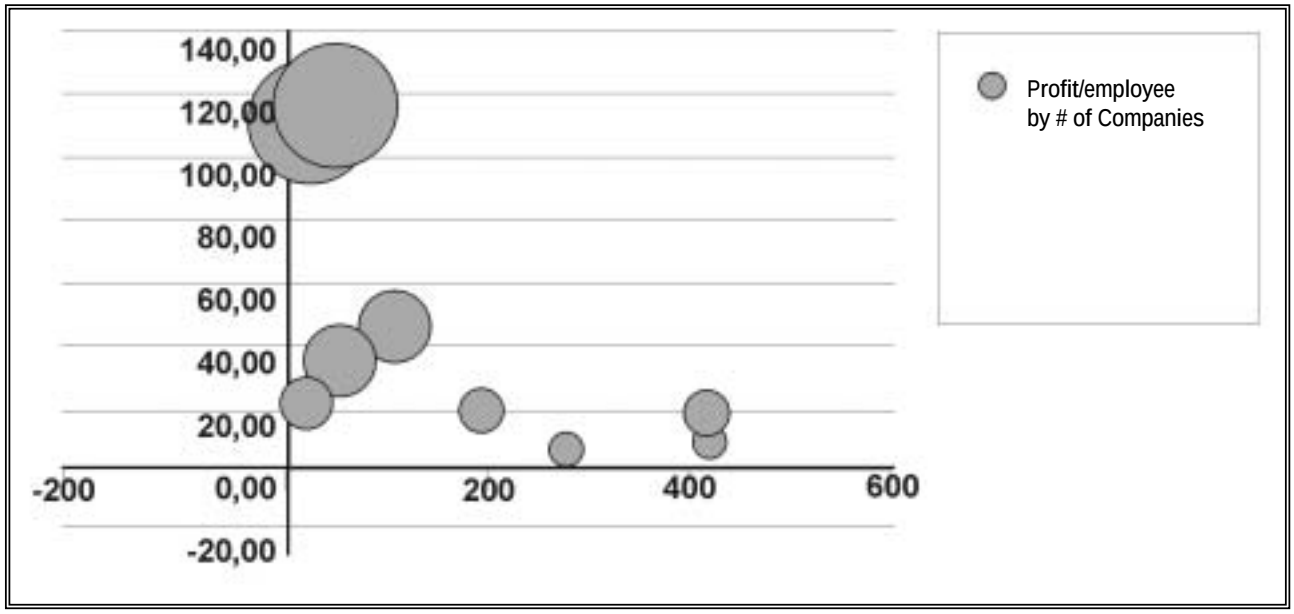


Income and profit structure

Income range (000 kn)	No of ICT companies	No of employees	Gross Income (000.0 00 kn)	Gross Profit (000 kn)
0-100	284	125	10.473	740
101-500	423	664	113.798	6.269
501-2000	420	1.485	436.997	28.346
2001-5000	194	1.254	587.487	25.743
5001-10000	100	1.148	694.133	52.845
10001-20000	50	909	724.003	34.384
20001-30000	20	691	464.652	16.470
30001-50000	12	317	464.804	34.652
50001-595247	35	1.587	4.287.172	182.499
		8.180	7.783.519	381.948


5.000.000
4.000.000
3.000.000
2.000.000
1.000.000
-1.000.000
-200
0
200
400
600
Gross Income
by # of Companies


3.500,00
3.000,00
2.500,00
2.000,00
1.500,00
1.000,00
500,00
-500,00
-200
0,00
200
400
600
Income/employee
by # of Companies


140,00
120,00
100,00
80,00
60,00
40,00
20,00
-20,00
-200
0,00
200
400
600
Profit/employee
by # of Companies

Telecommunications

Year	No of ICT companies	No of employees	Gross Income (000.000 kn)
2001	30	12,302	8,995.23
2002	43	12,312	10,475.42

Source: FINA, 2002

Employee Range	No of ICT companies		No of employees		Gross Income (000.000 kn)	
	2001	2002	2001	2002	2001	2002
0	5	11	0	0	0.69	0.34
1-10	20	24	70	87	35.17	12.46
11-50	3	5	45	76	38.96	16.46
51-100	0	1	0	381	0.00	8.42
501-1000	1	1	943	992	1,766.99	2,310.43
>1000	1	1	11,244	10,776	7,153.42	7,931.32

Source: FINA, 2002

3.10.4. MACEDONIA

The ICT Industry in Macedonia in the last years despite the economic situation in the country, which is very changeable, marks a continuing growth. Probably this is due to the situation where the companies seek and implement in their business functions, advanced and new ICT technologies in order to improve their competitiveness. Documentation of this growth is not supported by detailed annual data for the number of companies in the IT sector, but according to certain researches conducted in 2000, this number is assessed at somewhat more than 200 companies (though the Chamber of Commerce in Macedonia offers on its web site information that there are 61 companies in Macedonia classified in the group "computers and Internet" offering the following services:

- Assembly, sale and maintenance of PC's
- Sale of computer peripherals
- Design and implementation of Network systems
- System Integration
- Sale and maintenance of software
- Development of Software solutions
- Web design & multimedia
- IT Consulting
- IT Training & education

For the situation and the activities of the ICT industry in Macedonia, as well as the companies working in this sector, several researches and analyses have been carried out in the last four to five years, where all the information and data presented below in this part of the report and realized by the German Technical Cooperation (GTZ) and Ministry of Economy of Macedonia, US Agency for International Development (USAID), Macedonian Business Resource Center (MBRC). In addition, there are clear announcements that some institutions have plan for this year for further and deeper research of Macedonian ICT Profile: State Statistical Office of Republic of Macedonia, Macedonia Competitiveness Activity (MCA), and MASIT. The targets of these studies shall be to represent current developments, strengths, weaknesses and potentials of the ICT sector in Macedonia; to collect relevant data for important ICT indicators; and to inform the potential investors and international community about cooperation possibilities with Macedonian ICT companies as well as to show needs for technical support.

According to this researches for the IT market in Macedonia it is estimated that for the year 2000 it was around $37m, with the growth rate of 20% and with segmentation of 5% for the Internet services, software application represents 15%, and the largest part is computer hardware and operating systems with 80% (around 30 million USD). For 2002 the segmentation of the Market is a little bit different: software applications takes 36% of the overall IT market which is for 2003 estimated on 50 million Euros[93], the total software market is estimated for 2002 on 15 million Euros and only the system software contributes with 14% from total software market. In addition, the Internet market marks a growth every year and, by some estimations, in 2002 it represented an 11% share of the market. On average, for the last five years, the IT market as a whole has had an annual growth rate between 10-15% and software and IT services have had a higher growth than other segments.

Still, average sale of PC is approximately 15,000[94] for the past few years and the ratio between hardware and software is 70% to 30%. The yearly sale of PC's for the year 2000 is more than 23,000[95] and additionally 2,000 servers, and for the total number of installed

[93] Petar Indovski, Vice president of MASIT

[94] The number is based on the estimate through the evaluation of the situation of imported goods under tariff code "monitor", provided by the Custom Administration of Republic of Macedonia.

[95] Information Technology in Macedonia, MBRC, Skopje, 2000

Year	Number of PCs	PC/100 households	PC/1000 per capita
2001	72,000	12.02	34.98
2002	94,000	15.56	45.3
2003	118,000	20.16	58
2004	140,000	28	81.3

Source: Statistical office of the Republic of Macedonia

computers in the country there are estimation for 100,000 pieces, up to 150,000-200,000 according to other sources.

Most of the world's largest IT companies such as Microsoft, CISCO, IBM, Autodesk, Compaq, Hewlett Packard, Dell, Siemens, Sun Microsystems, Apple, Lotus, ORACLE are present in Macedonia via branch offices, distributors, dealers, resellers, solution providers and business partners. In addition, there are a number of companies oriented towards assembling, sale and maintenance of their own computer systems. Despite the fact that, considered as a percentage of the total sales, sales of brand-name computers is growing, still around 65% of PCs sold are assembled in Macedonia and only 35% are brand-name computers. The situation with the Servers is 55% Brand Name and 45% assembled in Macedonia.

The latest big move in direction of improvement of presence of the global IT companies in the country is the official opening of the Microsoft Office in Macedonia, as one of the items covered by the Strategic Partnership Agreement signed in December 2003 between the Government of the Republic of Macedonia and Microsoft Corporation. According to this Agreement Macedonian Government will access to company's licensed software, and in return, Microsoft will invest 6 million USD in the next four years in Macedonia and will open its office in the capital, in order to help implement its applications in the government institutions. Microsoft also agreed to donate over 6,000 software licenses for the use in the schools in the country. This document specifies conditions of donating license, the associated consultancy services, and lists five other agreements which fall under the Strategic Partnership Agreement, namely: Enterprise Agreement, Enterprise Enrolment Agreement, Microsoft Business Agreement, Donation Agreement, and Services Agreement). The total cost of this Agreement is 3.9 million USD.

There are 15 registered Internet Service Providers (ISP's) in the country, but only 10 of them are functioning. MTNet have the biggest share of the market with 56%[96], and all others ISPs (including the next largest three - On.Net, Macedonia On-Line, and Unet) divide the remaining 44% of the market.

The number of the employees in the IT companies in Macedonia ranges from 2 to 40 and it is approximately the same in the companies dealing with software development only. Mainly, the employees in this sector are highly qualified, well trained IT professionals, educated in some of the three universities in Macedonia, offering education to all the students of ICT specialties. There are around 60 employees in ISP's in Macedonia On-line, in MTNet-ISP owned by Macedonian Telecommunications, there are 74 employees and the average of this number for ISPs is around 20. In the companies dealing with telephone services operators the number of employees ranges from 250 employees in Cosmofon, 370 in Mobimak and 3.192 employees in Macedonian Telecommunications.

The average salary of IT professionals is around 400 Euros, and it is double than the total average for the Macedonian economy, but there are no separate data for professional in each ICT activity area.

Since 2000, MASIT (Macedonian Association of Information Technology) is established as an association of private companies in IT sector on Macedonian market whose basic activities are manufacturing, trading and services in the area of information technology.

Within the frames of the project Macedonian Competitiveness Activity at the end of 2003, an ICT cluster was established that would highlight Macedonia's skill base and provide an ICT platform from which leading Macedonian industrial sectors can produce and launch products that are more competitive.

3.10.5. MOLDOVA

In late 80s, producers of hardware and software were employing 50,000 specialists. Activities in this sector concentrated upon manufacturing of hardware (analog computers, integrated circuits, PC assemblage, etc.) and ordered software. In 1991 - 2000, many specialists had to emigrate or to leave the sector. Today we see some improvements of the situation. Many public and private academic institutions train ICT specialists. Over 1200 specialists of highest qualification were prepared in 2003 (750 in 2002), thus the annual rate of growth is quite high. The number of companies extending various IT services grows steadily, and the number of companies specializing in production of software and related services shows a slight stagnation.

During the year 2003, total volume of sales in this sector reported a considerable growth. At the same time, the government statistics reports a negative balance of software development activities. This can be explained by the fact that, due to specific features of the sector, the companies have a possibility to conceal real figures to evade unfavorable taxation. Evaluations made by some experts say that approximately. A significant number (90%) of the local IT exporters work in the shadow economy.

3.10.5.1. CURRENT SITUATION

Weaknesses

- Cessation of core businesses in computer industry in Moldova: Mezon, Vibropribor, Computer Plant, Volna, etc.
- Almost a complete lack of IT companies with over 100 employees
- Fewer than 10 officially registered companies with relevant export potential and steady relations on external markets
- Small capacity of internal market

Major problems

- Break of traditional relationships and loss of external customers
- Drain of highly qualified specialists
- Lack of a vast range of specialists necessary for the IT industry:

[96] Makedonski Telekomunikacii 2002 Annual Report, www.mt.com.mk

testers, technical writers, project managers
- Lack of domestic government orders
- Lack of legislative framework to regulate the IT sector
- Low productivity of labor in IT sector

Opportunities
- Existence of some extended relationships in IT industry in CIS countries
- High skills of specialists
- Multilingualism of population and specialists
- Advantageous geographic parameters and European time zone
- Low price of labor force

As a rule, there is no strong direct competition between the local producers of software packages, since each company usually offers unique products. Competition only takes place in IT services sector, in web-site building, for instance. In what regards development, there are two companies that produce software for banking sector, one company deals with programs for billing of telephone calls, three companies produce content management software, etc.

The capacity of the domestic market for programming is limited by the size of the country and its level of economic development. According to some estimates, in 2003 the volume of exported software products was worth of at least 2 million US dollars.

Price of software package products depends on the balance of demand and offer on the market and on unique sales points of these products. Thus, the price is influenced by exogenous rather than endogenous factors.

Price formation for ordered software differs much from the method of price formation for package software. The main factor governing the establishment of prices for ordered software is the cost of labor. The percentage of salaries in the structure of price for ordered software is about 60%. Working costs are much smaller - about 20-30%. The average net salary in IT industry was estimated to 309 US dollars per month in 2002, increasing to app. 350 US dollars in 2003. This salary is the starting point to build prices for products offered by the Moldavian companies. The average cost of one working hour is 6 US dollars, sometimes 8 US dollars. Ready-made products sold via Internet are usually paid for in advance. As for the ordered programming, 90% of companies practice a mixed method of payment (part of the amount is paid in advance, the rest after execution of the order).

According to a survey made in 2003 by the MEPO (www.bizpro.md) on a sample of 21 IT companies, the total volume of software products reported in 2003 was 2.25 million US dollars. Part of this amount - 35% (0.79 million) - was due to the domestic consumption, and 65% (1.46 million) was due to exports. The average growth of sales reported in 2001-2003 was of 50% (1 million US dollars in 2001, and 1.6 million US dollars in 2003).

Half of the total numbers of producers who export their products are not directly involved in promotion of their own products and services. Promotion is done by third parties, which are overseas parent/daughter enterprises or strategic partners for distribution. Usually the IT producers in Moldova do not set up direct agencies abroad due to reporting difficulties, and are more inclined to open subordinate companies. On the other hand, Moldova does not enjoy a strong reputation in IT industry, the fact due to which Moldavian companies very often do not mention the origin of the product at the initial stage of business negotiations.

The total number of computers in the surveyed 21 companies is 578. If we compare this number to the number of full-time employed in these companies (485 persons), we can conclude that each employed has 1.19 computers.

As a rule, those IT companies which do not develop products on client's order, but sell ready-made products instead, do not observe standard stages in the life cycle of software products (analysis, modeling, system project, etc.). The developed products are thus the result of the company's technical capacities and experience. According to the results of the survey, all companies that develop IT products upon client's order use quite the same procedures of project management, which include the following elements:

(1) preliminary negotiation with the client;
(2) getting the client's order;
(3) a general identification of objectives;
(4) setting up of a contract;
(5) getting technical specifications and special requirements from the client;
(6) resource and time planning for the identified tasks;
(7) technical proposal is sent to the client for approval;
(8) project development or implementation stage;
(9) testing of the product;
(10) trouble-shooting;
(11) development and approval of technical documentation;
(12) launching of the final product;
(13) delivery of the finalized modules or products. As a rule, the companies use Microsoft Project 2000 for project management.

Only a few IT companies follow standard protocols RUPP (Rational Unified Process), IEEE, Prince 2, MSF) in their technological processes.

Quality criterion for the ready-made products is measured by the clients' satisfaction. These IT companies have their own methodologies to ensure quality and to test software.

Those companies that execute orders, on the other hand, have more instruments to ensure the quality of product. Among such instruments:

(1) testing of the product by company's experts;
(2) use of services of an independent tester;
(3) use of standard instruments of automatic testing;
(4) use of quality control method QA;
(5) quality control by client.

According to Moldavian legislation, the government agency authorized to develop standards for IT activities is the State Department for Standardization and Metrology (Moldovastandard). However, so far no standard has been developed for IT sector. There are no labs or centers accredited by Moldovastandard for testing or certification of products.

The majority of the surveyed companies (71%) do not possess ISO 9000 quality certificates or any other certificates. However, some companies undertake efforts to get international quality certificates that would confirm their capacities and quality of work. Several companies mentioned other ways to ensure quality of products, for instance, public appreciation and positive references in mass media.

3.10.5.2. HUMAN RESOURCES

Here we can observe a trend of steady growth, in spite of the fact that

some companies registered a considerable reduction of the number of employees. Most employees work on basis of their job contracts and are among the permanent staff of the companies. At the same time, due to high taxes levied on incomes of individuals, some companies prefer to register some groups of employees as holders of patents.

The percentage of programmers in a typical IT company in Moldova is 46%. But given the fact that in small and middle companies the management personnel often combines functions of business administration and project management, and the project managers can at the same time be testers and programmers, the percentage of employed programmers thus can be significantly higher.

If the technological process between the customer and an IT company is organized correctly, only 5 - 10% of the company's personnel participate in direct dialog involving both parties. Besides the Russian and the Romanian languages, quite a big number of specialists also speak English, the fact that considerably facilitates relations between the foreign clients and companies. A growing number of specialists speak French, German and Italian.

The range of used technologies and computer languages is very big, almost any language can be found in use, from simple Pascal to MS .net.

The greater part of the specialists who work in IT companies are graduates of the Technical University, State University, and the Academy for Economic Studies. Of the total number of 485 employees, 15 hold a PhD degree, and many are Masters of Science. Besides these degrees, the most advanced IT companies organize training abroad for their employees and certify them through the international certification systems.

3.10.5.3. ECONOMIC AGENTS

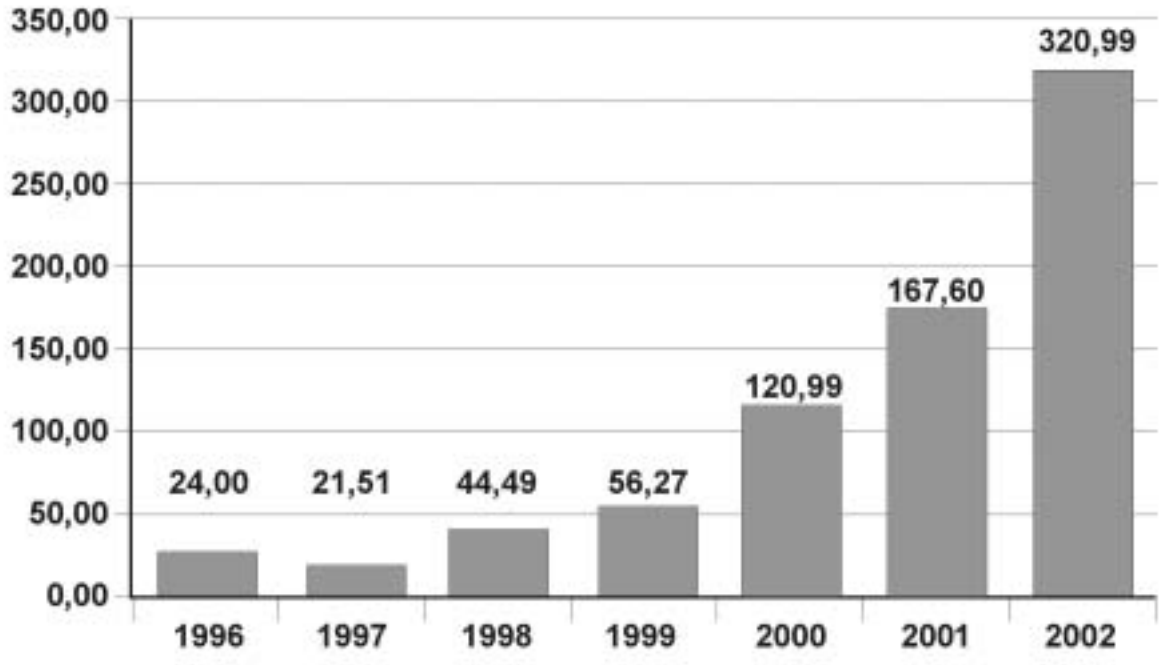
According to the State Registration Chamber, there were 1683 registered businesses as per January 1, 2003, with activities in IT sector. It was also then that a questionnaire for the Statistics Department was filled in by 1818 businesses that declared IT among their activities in conformity with the national codes of economic activities. This makes for about 7% of the total number of businesses on that date. The number of businesses licensed in IT industry as of January 1, 2004 increased two times compared to January 1, 2003 and counts over 453 licenses.

The number of IP operators also has grown considerably. The number of informational service providers in public centers has doubled. In early 2003 there were only 106 Internet-cafes, while on April 15, 2004 there were opened 194 Internet-cafes, of which over 160 are located in Chisinau municipality and only 27 in other localities of the country.

There are 68 operators that offer data transmission services (Internet-providers), among them we should mention Moldtelecom, Globnet, AraxImpex, RENAM, Moldpac, MoldData, TelemediaGrup, Riscom, DNT, etc.

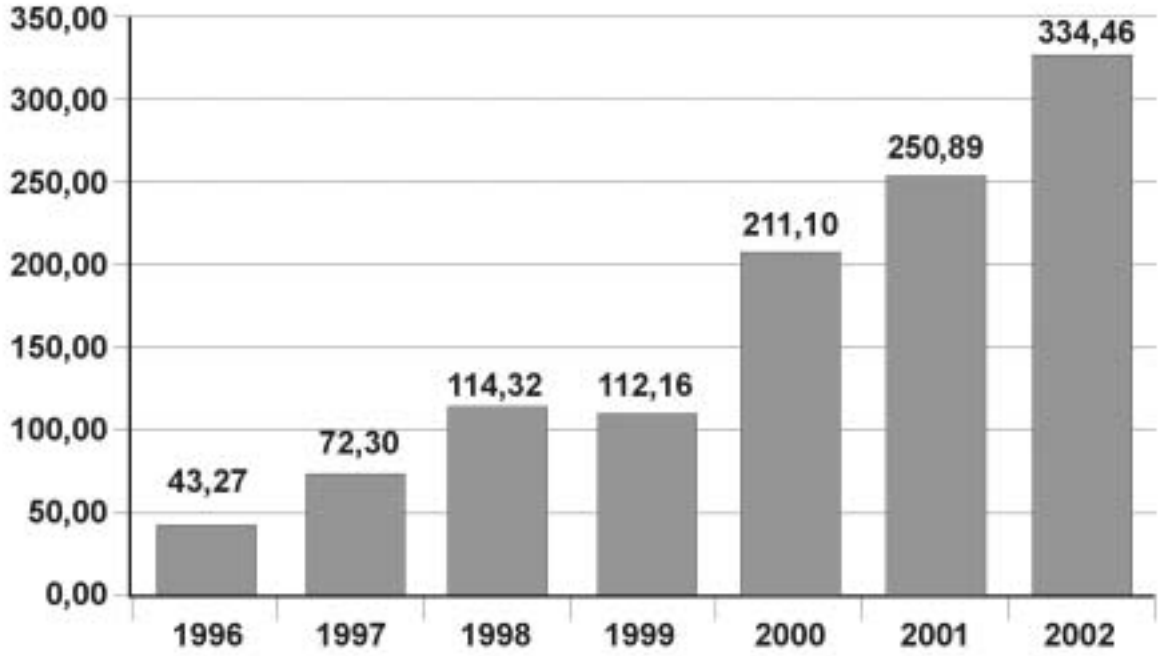
In 2003, compared to the year 2002, the number of subscribers to mobile operators Voxtel and Moldcell grew three times, with 21.5 fixed telephones and 13.5 mobile telephones per 100 persons. In 2002, these figures were 19.5 and 9.3 respectively.

The following figure shows allocations for informatization in Moldova, years 1996 - 2002 (m lei). :



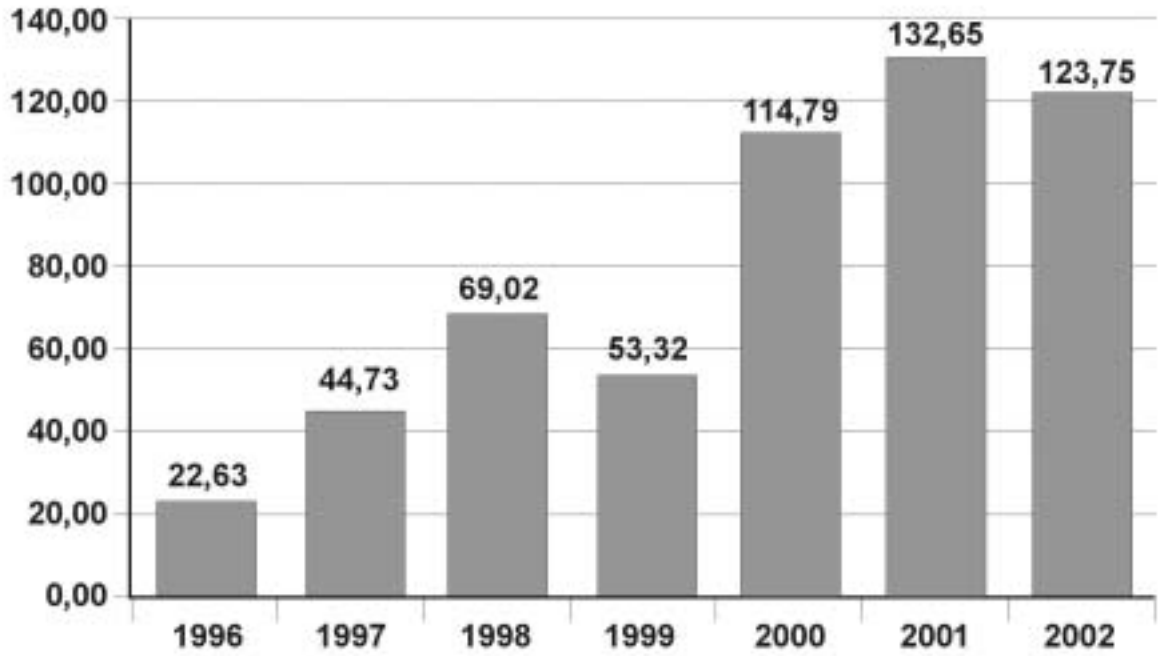
Allocations for informatization from the state budget of Moldova, 2000 - 7.2 million lei, 2001 - 7.6 million lei, 2002 - 17.5 million lei, or 0.24%, 0.23%, and 0.49%.

The following figure shows expenses for informatization in Moldova, years 1996 - 2002 (million lei) - total:



From the amount of 334.5 million lei spent in 2002, the largest part of expenditures (over 250 million lei) was spent to purchase hard and software. The amount spent on design and project activities is 7 million lei.

The following figure shows expenditures for procurement of hardware, years 1996-2002 (million lei) - total:



These expenditures make the following percentage:

	PC purchasing	Software development
1996	52,3%;	7,5%
1997	61,9%;	5,5%
1998	60,4%;	7,0%
1999	47,5%;	3,3%
2000	54,4%;	5,1%
2001	52,9%;	2,3%
2002	37,0%;	2,1%

3.10.5.4. IT COMPANIES EXAMPLES

Compudava (http://www.compudava.md) is a subsidiary of Brains Direct Ltd, a British software company. It offers offshore software development services to regional and overseas companies and corporations. They give companies the opportunity to reduce their expenses on custom software solutions as well as on their IT infrastructures, while maintaining a high level of quality. Compudava has brought together a team of over one hundred IT professionals with in-depth knowledge and experience in the software development business, ready to turn customer's software problem into a fully designed, implemented, tested, and delivered solution. Being a member of Brains Direct Group, Compudava applies western standards of quality. The company has successfully developed projects for the industry leading companies in such areas as: Internet Services, E-Commerce, Data Protection, Public Relations, Medical IT, Custom Hardware, etc.

ISABEL S.A. company (http://www.babilon.md) was founded in July 1994. In 1995, the company set up a division to deal with computers and peripheries. The tasks of this division were: computer market study in Moldova and perspectives for Computer Industry development in general. In 1996, ISABEL S.A. company becomes an exclusive representative in Moldova for the largest world companies Nisko (leader in development of electronic meters with SmartCard) and Telrad (world leader in telecommunications). In August 1997, the company opened a computer shop - Computer Center BABYLON, which represents the whole spectrum of computers and peripheral devices. Besides, the company deals with software development, web design, and advertising.

Dekart company (http://www.dekart.md/index_ro.html) pursues research & development activities in IT and smart cards. We can mention here some of its products:

- DEKART Digital Signature System®
- Regional Media Pay System that uses smart cards and certification of transactions (DEKART Media Pay®)
- System of programs for cryptographic protection of data on a PC by using smart-technologies (DEKART Private Disk®)
- Soft and Technical Complex to store cryptographic keys and secret information by using smart-technologies (DEKART SmartKey®)
- Complex for Software Protection against Unapproved Copying (DEKART Program Protection®)
- Secrets Keeper Complex that ensures protection of information against unapproved access
- A Set of Applications for Testing Aleatory Consequences (DEKART Random Run's Tests®)
- Center for Certification of Public Keys (DEKART Certification Authority®)

Deeplace (http://deeplace.md/) - Application Design and Integration

- Application Design and Integration
- Web Development and Source Integration
- Design/Interactive Application Development
- M-Commerce Solution
- CMS Development
- On-Line Banking Systems

The firm IMCO Ltd (http://www.imco.md/) offers a large variety of Internet services, including the registration of .md domains, Web design, domain hosting and administration. The key to success is the integration of the client's personal requirements and his specific activity through the application of high programming techniques. The firm of production and research "IMCO" Ltd. was founded in October 1991 as a result of "AFN" Ltd. division. The main field of activity is specialized soft research and elaboration. The essential characteristic of the activity is individualizing client's orders and executing them on time according to the pre-established requirements.

RITLABS (http://www.ritlabs.com) develops computer software for corporate and individual users. The most popular product is The Bat!, a small yet extremely flexible e-mail client with extensive capabilities not found in other e-mail clients. RITLABS have created a series of successful products, such as Argus, SecureBat!, BatPost and others. Users of software range from home users to business and government institutions including Banks, Financial, Aerospace, Gas and Oil producers, IT software and hardware companies and a wide spectrum of small and large businesses. The user base has grown to become many thousands.

RITLABS provides following services:

- Distribute and support existing software products.
- Develop and support new solutions based on our product platform.
- Develop and support new desktop and server-side communications software.

SOFT-BYTE SRL Company (http://www.ournet.md/~softbyte/) deals with development of technology of computer-aided accounting and creation of new soft products in this area. Its main product is a package of accounting programs "GROSSBUCH". Programs in this series are meant for computer-aided accounting. Products of SOFT-BYTE are run on dozens of various businesses in Chisinau, Ungheni, Balti, Ribnita, and Tiraspol. The company offers a warranty, training and support services.

WebArt Studio of "Relsoft Communications" Company (http://job.webart.md/) is a resource oriented to search for and employment of high-tech specialists in such fields as Internet, Intranet, IP Telephony, cryptography, banking technologies, WEB projects, programming. Its database contains two sections reflecting demand and offer on the labor market:

- Application forms of groups and individual specialists looking for a job
- Offers from organizations of the available vacancies

All data, after their moderation, are open for free view, the visitors can contact each other directly without any intermediary involved. The section "Statistics" offers generalized information on surplus, demand and deficit of some jobs in the forms to be fulfilled on the server.

The Starnet Company (http://www.starnet.md) offers services, among which: access to Internet, physical connection, necessary equipment and its configuration. The Company uses only equipment and technologies of the latest generation enabling radio access, servers for web-hosting services, e-mail, etc. Offers include unlimited and free access to Moldavian Internet and to the local network StarNet that has a considerable number of films, games, music, soft, etc. including free advice on connection. Any problems are quickly examined and settled by professionals. The Company is connected to Internet Orhei Municipality.

3.10.6. SCG - KOSOVO

The business environment in Kosovo is regarded better than in many transition economies. The recent Investment Climate Survey found that domestic and foreign investors generally regard the business environment as positive. A relatively strong legislative foundation for a market economy is largely in place. Most firms indicate satisfaction with macro-economic stability, labor regulations, skills of the workforce, and administration of business licenses and operating permits. While at the operational level the unreliable electricity supply is a key problem, continuing uncertainty about final status continues to deter investment and business growth. (World Bank: Transitional Support Strategy for Kosovo, March 2004)

As common in many post-conflict environments, Kosovo experienced robust, double-digit growth rates in 2000 and 2001. This has resulted in average GDP per capita doubling from less than $400 in 2000 to about $640 in 2002 and almost US$790 in 2003. Growth has, however, begun to slow. Growth has been driven especially by a large number of new small and medium enterprises (SMEs) concentrated in the construction, service and retailing sectors while an average of 90 per year days with power outages and the purchase of alternative power supplies has inevitably affected the slow growth of the ICT industry.

Kosovo is still behind in recognizing the opportunity and acknowledging the potential of ICT industry. In the ICT industry sector the Government has not achieved success yet in attracting leading international ICT companies and their development programs. Foreign investment in ICT as a priority area is not being clearly encouraged. Development of ICT industry seems to be affected with the actual shift of the Government's and donor's priorities towards agriculture, energy and mining as mass-employing industries that will supposedly have a quicker impact in reducing the broadening poverty in the country.

Nothing has been done to plan the necessary infrastructure for the long-term economic re-launch. In addition, the privatization process was considerably delayed by the failure to provide resolution to various property-related issues. The lagging legal framework and the political instability (Kosovo's uncertain political status) round up the situation that caused practically no inflow of foreign capitals[97].

Mayor investments in ICT sector have been made by the local resources. The foreign investment, when present, is originating from the large Kosovan diaspora. The international capital has yet to enter the Kosovo market. Possible leads to foreign capital investment would be PTK, communication infrastructure, ISP's, cable operators, and independent software development companies.

Kosovo ICT industry consists mainly of small and medium companies that import PC components and assemble them locally. Increasingly, there is a tendency of importing pre-assembled brand-name PCs and other equipment. There is no data available on the annual business turnaround in ICT industry in the country, although it is presumed to be high. The lack of data on the size of the ICT market is a specific obstacle to having authorized distribution channels as well as in-country vendor presence and support. There are still brands that enter the country through distributors in neighboring countries that are obviously impaired to offer authorized support in Kosovo.

Situation regarding the software in Kosovo, not surprisingly, follows the patterns of Eastern Europe. The spending in software is very low, due to the prevalence of piracy. One can still buy the latest version of Windows, MS Office, AutoCAD, etc., at almost any kiosk in Prishtina or elsewhere in Kosovo for 1.5-3 Euros. Needless to say, software piracy practices do not help in developing the local ICT and software industry as well.

No strategic and favorable partnerships or agreements have been reached yet by the Government with major ICT and software vendors. The Ministry of Public Services has undertaken some important steps in licensing and legalizing its software, but this regards only the ministry's "in-house", software inventory. There is no campaign being carried out or planned for the near future for educating the masses and for enforcing legalizing of the software.

The software industry in Kosovo has been mainly developing in two directions:

- The newly established companies tend to be completely based on local human resources. They usually find it hard to convince the customers of their potential. Lack of an extensive list of references is one problem. Another is the inability to quickly demonstrate the six-digit turnover that is consistently required for most of the bids issued by the government (the most important customer in the country).
- There are local companies in Kosovo oriented towards representing foreign companies. These usually outsource or create partnerships with companies in neighboring countries or may enter into joint ventures with Kosovan professionals abroad. There are two reasons for this: First, the local company may not have the capacity to carry out the job on their own and secondly, it is easier to win the job in first place if the company is based out of Kosovo! The second reason comes as a consequence of the high duty and customs for raw materials (parts and equipment) for local companies as well as by UNMIK's unilateral interpretation of laws on preferential import of goods with the origin from ex-YU countries.

Any attempt to assess the dimensions of Kosovo's IT industry today must include assumptions and rough estimates. Data provided by SOK are based on the division made according to the 17 Section (A-Q) of NACE, Rev.1 (Statistical Classification of Economic Activities), and thus

[97] OneWorld.net, Economy, December 2002, www.oneworld.net/article/view/33780/1/

	Entities	Enterprise	Individual entrepreneurs
Manufacture of computers and other systems	4	1	3
Telecommunications	115	89	26
Hardware consultancy	28	22	6
Software consultancy and supply	38	31	7
Data processing	9	7	2
Maintenance and repair	22	17	5
Other computer related activities	35	29	6

(Source: Statistical Overview of Registered Businesses till December 31. 2002)

majority of the ICT companies have been included in the Wholesale and Retail Trade and Communication section. The Statistics Office of Kosovo in its analytical series has still very basic and broad set of categories that correlate with the ICT sector. By the end of 2002, according to the most recent statistics from SOK (Statistical overview of Registered Businesses till December 31. 2002, Statistical Office of Kosovo, March 2003), the break down by categories shows there are 115 entities registered to perform among others, within the "Telecommunications" area. The second place is held by "Software consultancy and supply" (38 entities) and the least represented are "Manufacture of computers and other information systems" (4 entities).

The average salaries in the ICT industry depends on where the employment takes place:

Government:

- From 170 to 400 € per month (technical)
- From 250 to 600 € per month (managerial, ministry heads)

Post and Telecommunication of Kosovo (PTK):

- From 250 to 350 € per month (technical)
- Approximately 400-500 € per month (engineers)
- 500-600 € per month (project managers)
- From 700 € per month (department managers)
- Average monthly wages (Euro) 312; Total number of employees 1,832 (see: SOK)

Private enterprises:

- From 250 to 350 € per month (technical support,)
- Approximately 450-700 € per month (engineers)
- Approximately 600-1000 € per month (engineers / project managers)
- Developers approximately ranging from 750 € per month and up

NGOs:

- From 350 to 550 € per month (technical)
- Approximately 500-800 € per month (engineers)
- Approximately 650-1100 € per month (engineers / project managers)
- From 900 (department managers)

	Hardware	Software development	Networking	Consultancy	Service	ISP	Education
KOMTEL							
www.komtel-pe.com	o	o	o	o	o	-	-
Pronet							
www.dardaniaonline.com/pronet	o	o	o	o	o	-	-
COMTRADE							
www.comtradecomputers.como	o	o	o	o	-	o	
INFOTRADE	o	o	o	-	o	-	-
ART House							
www.arthousepr.com	o	-	o	-	o	-	-
ILIR CANON KOSOVA							
www.ilircanon.com	o	-	-	-	o	-	-
VISION computers	o	-	-	-	o	-	-
ASK TRADE COMPUTERS							
www.ask-trade.como	-	-	-	o	-	-	
POWER PC	o	-	-	-	o	-	-
DataCom	o	-	o	-	o	-	-
Media Market	o	-	o	-	o	-	-
GO^IN computers	o	-	-	-	o	-	-

	Hardware	Software development	Networking	Consultancy	Service	ISP	Education
Saturn Computers	o	-	-	-	-	-	-
CACTTUS http://www.cacttus.com/	-	o		o	-	-	o
Smart Bits	o	-	-	o	o	-	o
KUJTESA www.kujtesa.com	o	o	o	o	-	o	o
IPKO	-	o	-	o	-	o	-
COMPTeam	-	-	-	o	-	o	-
AtiKos	-	o	o	o	-	o	o
KosovaOnline	-	-	-	-	o	-	-

3.10.7. SCG - MONTENEGRO

There are a significant number of ICT companies for development, implementation and sale of different solutions. Many are authorized partners of greater ICT companies.

There is no computer manufacturing, but there are companies that assemble computers, systems, and networks (LAN, MAN, and WAN). .

A significant number of these companies also provide professional software solutions.

The average salary of ICT experts is € 400-500.

3.10.8. SCG - SERBIA

3.10.8.1. SOFTWARE INDUSTRY (DATA FOR 2000)

- Production is worth $54 million --- 0.55% M USDof Serbian GDP.
- Number of employees is 6,600 --- 0.49% of employed workers.
- Software products are very competitive on world market.
- The best engineers work for affiliates of foreign firms. The average net salaries in these firms are 500 euros. In domestic firms, the salaries are lower.
- In last 10 years, 80% of the software experts left the country and emigrated (mainly to USA, Canada and Australia).
- The software industry is concentrated in 15 middle size firms (50-500 employees) and in around 500 SMS companies.

3.10.8.2.TELECOM INDUSTRY (DATA FOR 2000)

- Production is worth 40 M USD --- 0.41% of Serbian GDP.
- Number of employees is 3,891 -- 0.29% of employed workers.
- Only some products are competitive in prices on world market (such as digital phone centrals and optical digital transmission systems)..
- The biggest problems in this industry are: Brain drain , the necessity for new investment for reconstruction of production systems, and the introduction into those production programs more modern products.
- Telecom industry is concentrated in one middle big size firm (500-1000 employees), in 18 middle firms (50-500 employees) and in 150 SMS companies.
- Most famous companies in this industry are:
  - The consortium of producers of telecommunication equipment and systems Serbiatel (consists of IRITEL, Pupin Telekom, IMTEL, Institute Mihajlo Pupin, Telefonkabl)
  - Pupin-Alkatale and VFtel-mixed companies with Alcatel and Siemens in production of communication and transmission systems
  - EI Holding: EI EKOS antennas systems
  - Domestic cable producers-FKS Jagodina and Novkabel Novi Sad

3.10.8.3. ELECTRONICS INDUSTRY (DATA FOR 2000)

- Production worth 135 M USD what is 1,38% of Serbian GDP
- Number of employees 34.628 what is 2,59% of total Serbian employed workers
- Production capacities are very old and the products are mainly outdated and not competitive for either the domestic or the world market.
- The biggest problems in this industry are: big investments in new equipment and technology, long term development based on cooperation with foreign partners who would by investment in our factories bring new technology and organizational practice, cooperation between domestic factories and I&R capacities.
- In last 10 years, 80% of the software experts left the country and emigrated (mainly to USA, Canada and Australia).
- Electronic industry is concentrated in one very big company (over 4.000 employees), 1 middle big firm (500-1000 employees), in 6 middle firms (50-500 employees) and in around 100 SMS companies(up to 50 employees). EI from Nis is the biggest company to need complete reconstruction in the majority of its production sectors and programs.

3.10.8.4. ICT EMPLOYMENT OPPORTUNITIES

Over 200,000 locally educated people have left Serbia and Montenegro due to difficult economic conditions, and have succeeded in obtaining jobs across the globe. The Internet has enabled its users to keep operating and to practice, and perform professional and social activities.

The number of employees within the field of telecommunications is now approximately 20,000 (estimation) and will certainly increase. The number of telecom engineers is insufficient to cover the existing market. With the development of new products and services (fixed telephony, cable & wireless services, mobile services etc.), jobs will be created for thousands of employees. Technical skills in the community are becoming a source of competitive advantage and are beginning to

attract investment and employment opportunities from companies outside the community.

Opportunities for highly educated workers do exist within the country, although the conditions and salaries cannot compete with those abroad. Average salary range for highly skilled workers is $ 350 US - $ 800 US per month. At present, most workers with ICT experience leave the community and search for jobs abroad.

Only a small number of companies have specialized in developing software/hardware solutions. Establishing international cooperation is managing to keep their employees.

Unofficial statistics have it that there are about 3,000 ICT professionals working for foreign companies in Serbia" mainly in software development for foreign markets (outsourcing business concept).

However these companies are still in the "gray area" as this sector is not being entirely covered by the legislative" mainly due to the unregulated tax and investment laws.

In order to stimulate the development of ICT sector and stimulate the employment, the Government of Serbia needs to provide a clear strategy on deregulation of Telecom monopoly and a strategy on business development of the ICT sector

3.10.8.5. ICT IN THE WORKPLACES

Most of the domestic companies their on-line financial transactions are handling through the international service providers, which causes a direct domestic financial loss for the service costs of the foreign providers.

Within the past 2 years, the basic requirement for acquiring employment has included the computer literacy. This is characteristic for all domestic SME's, however advanced software functions are being very rarely used.

Within the larger companies, many computers in business offices are internally networked for data processing, management reporting, and other enterprise applications. Some employees conduct research transactions over the Web and some employees use e-mail for internal communication.

Most employees have limited access to telephones. Telephones are available -- however dialing of mobile or international numbers is restricted. Most employees do not have e-mail accounts or Internet access from personal workstations. Some companies do provide the Internet on all workstations, but most of them limit the access.

Efficiency gains resulting from the use of ICT systems are widely recognized. Major obstacle for more intensive implementation is the cost of additional equipment and services.

References

· A Memorandum on Lifelong Learning, OF THE EUROPEAN COMMUNITIES, 2003
· A Standardization Work Programme for "Learning and Training Technologies & Educational Multimedia Software", Workshop Agreement CWA 14040:2000 E, CEN October 2000
· A Strategy to Promote E-Commerce in Queensland
· AAD - Action plan for 1999-2001 - Electronic Government
· AAD - European Commission Green Paper on Public Sector Information in the Information Society.
· AAD - Implementing Public Key Infrastructure in Government
· Action Plan for Development of Information Society in Bosnia and Herzegovina, Council of Ministers BiH, and UNDP BiH, 2004.

· Bacevic Lj., The Development of Internet in Yugoslavia, 2003, http://soemz.euv-frankfurt-o.de
· Banking and Payment Authority of Kosovo (BPK), Functions and Responsibilities, http://www.bpk-kos.org/english/functions.htm.
· Basic Facts and Indicators, ESIS, January 2001
· Bilic N, Hadzialic M., UNDP ICT Forum: Communication Infrastructure, Sarajevo, BiH, 2002.
· BOS, Globalni gradjanin, Empirijska studija korisnika Interneta u Srbiji 2003, Beograd, 2004.

· CIPS Project, Council of Ministers Bosnia and Herzegovina, Sarajevo 2002
· Competitiveness Report for BiH: 2001, Academy of Sciences and Arts, BiH, and MIT Center, Sarajevo, 2002
· Competitiveness Report for BiH: 2002, Academy of Sciences and Arts, BiH, and MIT Center, Sarajevo, 2003
· "Communication Infrastructure Assessment - eSEE Countries", INA
· Croatian Government Answers to the European Commission Questionnaire prepared as a basis for the Commission's opinion (avis) on Croatia's application

· DECISION No 2318/2003/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 December 2003: Adopting a multi-annual programme (2004 to 2006) for the effective integration of information and communication technologies (ICT) in education and training systems in Europe (e-Learning Programme)
· Demekas, Dimitri G. / Herderschee, Johannes / Jacobs, Davina F. (2002), IMF: "Kosovo - Institutions and Policies for Reconstruction and Growth", 2002, www.imf.org/external/pubs/ft/kosovo/2002/eng/iprg/IPRG.pdf

· EAR, Contribution to public administration reform, http://www.ear.eu.int/kosovo/kosovo.htm.
· EAR, Future VET needs & engagements in South Eastern Europe, http://www.ear.eu.int/publications/news-a1f2adii3.htm
· EAR, Post and Telecommunications, Economic Reconstruction and Development in South Eastern Europe, (www.seerecon.org/kosovo/documents/reconstruction2000/post.htm)
· Education and Training 2010, COMMISSION OF THE EUROPEAN COMMUNITIES, 2003
· Education Committee, Stability Pact for SEE (June 2001), Thematic Review of National Policies for Education - Kosovo, Centre for Cooperation with Non-Members; Directorate for Education, Employment, Labour and Social Affairs
· eEurope 2002 Action Plan
· eEurope 2002 Action Plan and the "eEurope Benchmarking Report eEurope 2002", Commission Communication of 5 February 2002.
· eEurope 2003 Action Plan
· eEurope 2005: An information society for all. An Action Plan to be presented in view of the Sevilla European Council, 21/22 June 2002.
· eEurope 2005: Benchmarking Indicators, Commission Communication of 21 November 2002.
· eEurope+ 2003: A co-operative effort to implement the Information Society in Europe, Action Plan prepared by the Candidate Countries with the assistance of the European Commission
· E-Governance - the Next Generation, Mohan Sawhney, Kellogg School of Management
· e-Learning : Designing Tomorrow's Education, A Mid-Term Report, COMMISSION OF THE EUROPEAN COMMUNITIES, 2003
· e-Norway 2005, Ministry of Trade and Industry, Oslo 2002
· eReadiness Assessment Report, UNDP, BiH, 2003
· European Commission, Information Society Directorate-General, September 2003
· European Commission, Information Society: e-Content projects, Luxembourg, 2001
· European Commission, IST 2003, October 2003.
· Federal Ministry of Education and Science, FBiH, PCU Education: "Education Development Project Status", 2003.

· Global Information Technology Report 2003-2004, The International Bank for Reconstruction and Development / The World Bank, World Economic Forum, and INSEAD, 2004
· Group of Authors (April 2004), International Conference on Higher Education: "New Realities and Challenges in Higher Education", Prishtinë 23-24.04.2004, handout

· Health Information System (HIS), http://www.aggs.de/kosovo/index.htm

· I. Bolun. Dezvoltarea i-afacerilor în contextul edificării Societăþii informaþionale în Republica Moldova. Fundaþia pentru Dezvoltare Digitalã din Moldova. Chisinau, 2003
· ICT Forum, Conference Proceedings, UNDP, BiH, 2003

- Ilazi, Hasnije (December 2002), PRONI, SIDA, Ministry of Culture, Youth, Sport and NRA - Department of Youth: "The Research on Youth in Kosovë"
- IMG (March 2000), Kosovo Telecommunications Damage Assessment and Sector Survey
- IMI al A.ª.M. Conectivitatea ºi accesul public la Tehnologiile Societãþii Informaþionale la nivel de comunitate. Studiu realizat în cadrul proiectului PNUD MOL/03/004 "Elaborarea strategiei naþionale de dezvoltare a societãþii informaþionale în Republica Moldova", 2004
- Independent Expert Group, eReadiness report for Serbia and Montenegro (2002/2003)-www.iexpertgroup.com
- Information and Communication Technology in the Strategy of Development of the Republic of Croatia, Executive Summary and Recommendations, Croatia, 2002
- Internet in Primary and Secondary Schools in F BiH, Federal Ministry of Education and Science, FBiH, 2002
- Intranet Solutions, ATI-KOS http://www.ati-kos.com/modula.php?id=11.
- ITIA, Development of ICT Management capacity of ITIA of the Government of Serbia, Inception Report, 2004

- Kosovo Assembly Portal, http://www.assembly-kosova.org, http://www.kuvendikosoves.org.

- Market Study of the Informational Software Technology Sector in Moldova. Prepared by Moldavian Export Promotion Organisation for BIZPRO - Moldova. Chisinau, January 2004, Millennium Development Goals. Desk Study. UNDP Republic of Moldova, 2003

- National Programme for the Integration of the Republic of Croatia into the European Union - 2004, Ministry of European Integrations, Croatia
- National Report on Strategy Implementation - Information and Communication Technology - Croatia in the 21st Century, Ministry of science and Technology, Croatia, 2003
- New eEurope Indicator Handbook, SIBIS, November 2003

- OECD "Measuring the Information Economy 2002", www.oecd.org/sti/measuring-infoeconomy
- OECD, "A proposal for a core list of indicators for ICT measurement", www.oecd.org
- OneWorld.net, (December 2002), Economy, http://www.oneworld.net/article/view/33780/1/

- Pedersen E., and Sabic Z., Education Management Information System (EMIS) Development, Education Development Project, Government of Bosnia and Herzegovina and The World Bank, 1999
- PISG (October 2002), Ministry of Public Services (MPS), Department of Information Technology (DIT): "E-Country Report", http://www.kosovo.undp.org/devservices/E-Country Report.pdf
- PISG (April 2004), Ministry of Education Science and Technology (MEST), "Strategjia e Arsimit të Lartë në Kosovë (2005-2015)", Draft
- PISG (February 2003), Ministry of Labour and Social Welfare (MLSW), Kosovo Vocal Education Training Strategy
- PISG (May 2002), The Programme of the Government of Kosovo, Adopted May 2002, Annex1
- PISG (November 2002), Ministry of Education Science and Technology (MEST), "A Better Education for All", A five-year Education Plan for Kosovo (2002-2007), Draft #2, unpublished
- PISG (November 2003), MPS: Request for Proposal for A vendor to Create and Manage a Web-based Government Service Portal for the Government of Kosovo, Bid Reference No. DIT/STH/030703-188
- PISG, (December 2002), Kosovo General Government 2003 Budget. (www.unmikonline.org/civiladm/cfa/2003KBudget_eng.doc)
- Policy for Development of Information Society in Bosnia and Herzegovina, Council of Ministers BiH, and UNDP BiH, 2004
- Policy Recommendations for Raising Croatia's Competitiveness, National Competitiveness Council, Croatia, 2004
- Poverty Reduction Strategy Paper (PRSP) Bosnia and Herzegovina, Councile of Ministers of BiH and The World Bank, 2003
- ProCredit Bank, Products, http://www.procreditbank-kos.com/en_cards_products.php?gjuha=english
- Pronet, Archive, http://www.dardaniaonline.com/pronet/eng/info.shtml
- Pupovci, Dukagjin / Ilazi, Hasnije (July 2003), Education For Democratic Citizenship: "From Policy to Effective Practice through Quality Assurance", Country Report: Kosovo.

- Radio Televizioni i Kosovës (RTK), http://www.rtklive.com/site/interaktive/beqiri.php
- Rrota Interactive, http://www.rrota.net/?krye=webfolio&lang=al.

- Sabic Z., Bakarsic K., Kukrika M., Ajanovic A., Lihovac H., Kacapor K., and Cukac N., "Information and Communication Technologies and Education Process", Proceedings of Millennium Development Goals and The Information Society - ICT for Development Conference, Sarajevo, 2003

- SIBIS - Workpackage 2: Topic Research and Indicator Development, Education, 2001
- SICRIS - Slovenian Current Research Information System, http://sicris.izum.si
- Sistem za pracenje i vrednovanje kvaliteta obrazovanja - predlog promena i inovacija (2002 - 2005) Radna grupa za osiguranje kvaliteta obrazovanja Beograd, decembar 2001
- Slovenia Action Plan eGovernment Up to 2004
- Sommers, Marc / Buckland, Peter (October 2002), International Institute for Educational Planning (IIEP), UNESCO: "Case Study on Education in Kosovo from June 1999 until September 2002", preliminary findings
- Spector, Bertram I. / Winbourne, Svetlana / Beck, Laurence D. (July 2003), USAID, Corruption in Kosovo: "Observations and Implications for USAID" http://www.dec.org/pdf_docs/PNACU939.pdf
- Statistical Office of Kosovo - SOK (March 2003), Basic Demographic Data for Kosovo, http://www.sok-kosovo.org/pdf/population/Basic Demographic Data for Kosovo.pdf

- Statistical Office of Kosovo - SOK (March 2003), Statistical Overview of Registered Businesses in Kosovo till December 2002, http://www.sok-kosovo.org/publications/businessregister.htm
- Stidiu analitic referitor la rolul TI în majorarea competitivitãþii economiei naþionale. Agency for restructuring & Entreprises Assistance. Chisinau, Moldova, 2004.
- Strategija privrednog razvoja Srbije do 2010. godine, Republika Srbija, Ministarstvo za nauku, tehnologiju i razvoj
- Strategija razvoja Srbije do 2010. godine
- Strategy for Development of Information Society in Bosnia and Herzegovina, Council of Ministers BiH, and UNDP BiH, 2004
- Study of Telecommunication and Internet Development in the Period 2003 - 2005, Faculty of Electrical Engineering and Computing, Croatia, 2003, in Croatian

- Telemedicine Centre of Kosova (TCK), www.ivhospital.org
- The European Commission / The World Bank (November 1999), Toward Stability And Prosperity, A Program For Reconstruction And Recovery in Kosovo
- The Internet Market in Croatia 2002 - 2007, IDC, July 2003
- The World Bank (March 2004), Transitional Support Strategy for Kosovo (TSS), final draft
- The World Bank (November 1999), "Kosovo: Building Peace Through Sustained Growth - The Economic and Social Policy Agenda".
- The World Bank (September 2000), "Kosovo Telecommunications and Postal Sector".
- The World Bank, (April 2003), Education Participation Improvement Project (EPIP), http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000094946_03042604002460.

- UBO Creations (March 2003), Eurecna: The "Survey of 300 enterprises in Kosovo", http://pbosnia.kentlaw.edu/projects/kosovo/econ_development/survey of 300 enterprises in Kosovo.pdf.
- UN/ECE, Towards A Knowledge Based Economy, Yugoslavia, Country Readiness Assessment Report, UN, NY and Geneva, 2002
- UNDP - The Capacity Building Facility (CBF), http://www.ks.undp.org/Projects/CBF/cbf.htm
- UNDP (March 2003), "The Kosovo Mosaic: Perceptions of Local Government and Public Services in Kosovo", http://undg.ks.undp.org/mosaic/data/full_report_eng.zip
- UNDP, Support to Kosovo Information Technology (SKIT), http://www.ks.undp.org/Projects/SKIT/SKIT.htm.
- UNDP, Support to Parliamentary Electronic Archives in Kosovo (SPEAK), http://www.ks.undp.org/Projects/SPEAK/speak.htm
- UNMIK (April 2000), Regulation No.2000/23: on the Establishment Of The Administrative Department Of Post And Telecommunications
- UNMIK (December 2000), Department of Reconstruction (DOR): "Kosovo 2001 - 2003: From Reconstruction to growth", UNMIK, EU Pillar.
- UNMIK (December 2003), UNMIK/PR/1078; "Standards for Kosovo" (www.unmikonline.org/press/2003/pressr/pr1078.pdf)
- UNMIK (May 2003), UNMIK/REG/2003/16: Law on Telecommunications
- UNMIK (November 1999), UNMIK/REG/1999/20: on the Banking and Payments Authority of Kosovo, http://www.unmikonline.org/regulations/1999/reg20-99.htm
- UNMIK (October 1999), Regulation No.1999/12: on the Provision of Postal And Telecommunications Services In Kosovo
- UNMIK (October 2001), Regulation 2001/19: Amending the UNMIK/REG/1999/20 on the Banking and Payments Authority of Kosovo, http://www.unmikonline.org/regulations/2001/reg24-01.pdf
- UNMIK (September 2001), Regulation 2001/19: on the Executive Brach of the Provisional Institutions of Self-Government in Kosovo
- USAID (July 2002), USAID/Kosovo Annual Report FY 2002. http://www.unmikonline.org/civiladm/cfa/2003KBudget_eng.doc
- USAID, Telecommunication Reform, http://www.usaid.gov/missions/kosovo/Activities/telecom.htm

- Vidas-Bubanja M., The Importance of IT for the Development of Yugoslav Economy, Ekonomski anali, April 2001
- Vidas-Bubanja M., Vuksanovic E., Jošanov B., Role of e-business in transition of Yugoslav Economy, 15th Bled Electronic Commerce Conference e-Reality: Constructing the e-Economy, Bled, Slovenia, 2002

WWW References

www.amc.cal/
www.anih.com.al/
www.atnet.al/
www.cbbh.gov.ba
www.cra.ba
www.ear.eu.int/
www.ekosova.org
www.e-trgovina.co.yu
www.ictd.org.al/
www.Idea.co.yu
www.imf.org/
www.inatelecom.org
www.inatelecom.org/seta
www.instat.gov.al/
www.kfbih.com
www.kosovo-eicc.org/oek/
www.krstarica.co.yu
www.kta-kosovo.org
www.mafrd-kos.org
www.mash.gov.al/
www.minfin.gov.al/
www.mtpt.org
www.mtt.gov.al/
www.nato.int/
www.osce.org/kosovo/
www.ptkonline.com/
www.stabilitypact.org
www.stabilitypact.org/e-see/default.asp
www.statcan.ca
www.statistica.md/?lang=en.
www.terena.nl/compendium/
www.uni-pr.edu/
www.unmikonline.org/
www.usaidkbs.com/
www.vodafone.al/
www.worldbank.org/

STABILITY PACT
FOR SOUTH EASTERN EUROPE

UN Volunteers

UNDP